FUSION FOR ENERGY

The European Joint Undertaking for ITER and the Development of Fusion Energy

The Governing Board

DECISION OF THE GOVERNING BOARD ADOPTING THE FIRST AMENDED 2021 ANNUAL WORK PROGRAMME OF THE EUROPEAN JOINT UNDERTAKING FOR ITER AND THE DEVELOPMENT OF FUSION ENERGY

THE GOVERNING BOARD OF FUSION FOR ENERGY,

HAVING REGARD to the Statutes annexed to Council Decision (Euratom) No 198/2007 of 27 March 2007 establishing the European Joint Undertaking for ITER and the Development of Fusion Energy (hereinafter "Fusion for Energy") and conferring advantages upon it[1] (hereinafter "the Statutes") and in particular Article 6(3)(e) thereof, last amended on 10 February 2015 by Council Decision Euratom 2015/224[2];

HAVING REGARD to Council Decision (Euratom) No 791/2013 of 13 December 2013 amending Council Decision (Euratom) No 198/2007 establishing the European Joint Undertaking for ITER and the Development of Fusion Energy and conferring advantages upon it;[3]

HAVING REGARD to the Financial Regulation of Fusion for Energy[4] adopted by the Governing Board on 10 December 2019 (hereinafter "the Financial Regulation"), and in particular Title III thereof;

HAVING REGARD to Commission Delegated Regulation (EU) 2019/715 of 18 December 2018 on the framework financial regulation for the bodies set up under the TFEU and Euratom Treaty and referred to in Article 70 of Regulation (EU, Euratom) 2018/1046 of the European Parliament and of the Council,[5] and in particular Title III thereof;

HAVING REGARD to the comments and recommendations of the Joint Undertaking's Administration and Management Committee and of the Technical Advisory Panel on the first Amended 2021 Annual Work Programme;

WHEREAS:

(1) The Director shall, in accordance with Article 11 of the Statutes, prepare each year the submission of the project plan to the Governing Board, the resource estimates plan and the detailed annual work programme, now merged in the Single Programming Document.

(2) The Administration and Management Committee shall, in accordance with Article 8a (2) of the Statutes, comment on and make recommendations to the Governing Board on the proposal for the project plan, the work programme, the resource estimates plan, the staff establishment plan, the staff policy plan and other related matters, now part of the Single Programming Document drawn up by the Director;

(3) The Technical Advisory Panel, in accordance with Article 6 (1) of the Statutes, shall advise the Governing Board on the adoption and implementation of the project plan and work programme, now part of the Single Programming Document;

1 O.J. L 90 , 30.03.2007, p. 58.

2 O.J. L 37 , 13.02.2015, p.8.

3 OJ L 349, 21.12.2013 p100-102.

4 F4E(15)-GB34-12.9 adopted 02.12.2015.

5 OJ L 122, 10.5.2019, p. 1–38.

(4) The Governing Board, in accordance with Article 6 (3) (d) of the Statutes, shall adopt the project plan, work programme, resource estimates plan, the staff establishment plan and the staff policy plan, now part of the Single Programming Document;

HAS ADOPTED THIS DECISION:

Article 1

The 1st Amended 2021 Annual Work Programme of Fusion for Energy annexed to this Decision is hereby adopted.

Article 2

The Governing Board hereby delegates to the Director of Fusion for Energy the power to make non-substantial amendments to the 2021 annual Work Programme approved by the Governing Board.

Amendments to the 2021 annual Work Programme are considered to be non-substantial if they do not cause the financial resources allocated to the Action concerned in Table 2 of the annual Work Programme to increase by more than EUR 1 million or 10%, whichever is higher.

If the amendment exceeds the threshold, the Director shall obtain prior authorisation by the Bureau, at an extraordinary meeting or teleconference of the Bureau to be convened at the earliest convenience.

In any event, the increase of the financial resource of an action shall not exceed 3% of the total budget of the annual Work Programme for the given year.

In addition, any related changes to the scope of the annual 2021 Work Programme shall not have significant impact on the nature of the Actions or on the achievement of objectives of the multiannual Project Plan.

Non-substantial amendments shall not lead to any increase in the total operational expenditure for Title 3 and Title 4 of the annual Budget approved by the Governing Board.

Article 3

This Decision shall have immediate effect. Done in Barcelona, 5 November 2021.

For the Governing Board

Dr. Beatrix Vierkorn Rudolph
Chair of the Governing Board

Beatrix Vierkorn-Rudolph

For the Secretariat

Romina Bemelmans
Secretary of the Governing Board

Annex: First Amended 2021 Annual Work Programme

WP2021 – 1st Amendment

Executive Summary

Purpose

In accordance with the F4E Financial Regulation, this document lays down a detailed programme of activities that are foreseen to be implemented and financed under the budgetary appropriation for 2021.

Background

The Work Programme 2021 reference was adopted at GB49 in December 2020.

The available budget (see 1st Amendment to the 2021 Budget) was allocated to the various Actions identified in this document. The budget breakdown between Actions is shown in table 2 to this 1st Amendment to WP2021.

The Actions in the Work Programme represent the tasks planned in 2021 to contribute to the overall EU obligations to ITER.

Summary

The introductory memorandum provides an overview of the most substantial changes in this WP2021 Amendment 1.

The introductory memorandum provides detailed justifications for changes affecting both progress of work and budget. Some activities were moved to 2022, some others anticipated, others were cancelled and some were affected by technical delays, change of strategy or delays in the signature of PAs or other agreements. Some annual objectives, expected results and associated credits have been modified accordingly.

The F4E schedule used for the preparation of WP2021 amendment 1 is the version from end April 2021.

While the overall ITER schedule including assembly is under the control of the ITER Organization, F4E confirms that, to the best of their knowledge, no changes in this document will directly affect the 2025 First Plasma date or the overall project cost. F4E notes that the overall ITER schedule is under review by the ITER Organisation and ITER Council taking into account the impacts of Covid-19 and other events.

Recommendation:

The Governing Board of the Joint Undertaking is invited to adopt the attached document.

SPD2021_ANNEXES WORK PROGRAMME 2021 – Amendment 1

INTRODUCTORY MEMORANDUM

Changes to the Work Programme 2021

The Work Programme 2021 reference, as adopted at GB49, was based on the F4E set of schedules at the end of March 2020.

Since that time, the F4E schedule baseline has been regularly modified following the outcome of the Baseline Change Control Board at F4E. The annual objectives and call for tenders/proposals have been amended consequently.

With the continuous evolution of the project, F4E activities are also subject to modifications. Such changes are captured in the monthly update of the schedule.

Because of this continuous evolution, the work programme, that provides a snapshot of the schedule of the activities at a given time of the year, is prone to significant modifications between submissions to the F4E Governance.

While the work breakdown per year is a meaningful time interval from the budgetary point of view and for the WP that represents its financial decision, it is not for the long-term project that F4E has to implement. Therefore, it is normal that activities spanning over many years, the majority in the case of the F4E projects, may require adjustments in the specific year. Such modifications may be due to many reasons, as delays in the provision of input data for launching the contract, negative results from previous activities, need of modification of procurement strategy following a market analysis, delays in the delivery of hardware from other Domestic Agencies, addition of activities as a consequence of approved PCRs and risk mitigation actions, etc. In such a large high-technology project requiring in most of the cases the use of new technologies and manufacturing paths, it is therefore highly possible that the forecast of activities will vary during the year.

The main responsibility for the project managers at F4E is to avoid that these modifications affect the schedule of the delivery of the components to be assembled into the tokamak and, consequently, the creation of the first plasma.

While the overall ITER schedule including assembly is under the control of the ITER Organization, F4E confirms that, to the best of their knowledge, no changes in this document will directly affect the 2025 First Plasma date or the overall project cost. F4E notes that the overall ITER schedule is under review

by the ITER Organisation and ITER Council taking into account the impacts of Covid-19 and other events.

The available budget (see 1st Amendment to the 2021 Budget) was allocated to the various Actions identified in this document. The budget breakdown between Actions is shown table 2 to this 1st Amendment to WP2021.

The Actions in the Work Programme represent the tasks planned in 2021 to contribute to the overall EU obligations to ITER.

The summary of the most substantial changes is provided in the table below and doesn't include minor modifications. It is noted that the original Work Programme as amended by 1st Amendment reflect the full planned scope of activities for the year.

The F4E schedule used for the preparation of WP2021 Amendment 1 is the version from end April 2021.

The below table recaps the main changes per action brought by WP2021 Amendment 1. The budgetary changes are listed when the variation in value is more than 2M€ or more than 10% of the original budgetary allocation.

Action	Changes
Magnets	Budgetary changes: - 2,669,277€ (+) OPE-570: the increase in the forecast is due to the need of extra materials and consumables for the production of PF coils. (+) OPE-654: after a long negotiation with the supplier, the signature of the contract extension, originally foreseen in 2020, will be finally implemented in 2021. (-) OPE-414: the decrease in the forecast is due to a reduction of risks associated to the contract. Annual objective changes: Delivery of TF17 (EU07) by EU-DA to ITER Site [EU11.1A.11800] postponed to 2022 ➔ Some delay has been accumulated in previous coils that will impact this one. These are mainly due to: COVID-19 first and second waves and main milling machine (PAMA) issues with one key component that had to be replaced in order to resume production. Delivery of PF2 Coil by EU-DA to IO [EU11.3B.01120] moved from Q2 to Q4 2021 ➔ COVID-19 first and second waves impacted all PF production and PF5 & PF6 Coils were prioritized due to their schedule criticality. On top, some further delays on PF5 & PF6 Coils also impacted the delivery of PF2 (i.e, Non-Conformities during assembly, issues experienced in the Cryoplant and decision to carry out more time consuming pre-testing as a mitigation action for Coil failure risk during final testing).

	Change in targets (kIUA): Yearly CAS for TF Magnets PA reduced from 20.416 to 14.62 due to the delays commented above, the whole TF production was delayed. Yearly CAS for PF Magnets PA increased from 3.75 to 11.5. PF5 & PF6 Coils were initially planned to be delivered in 2020 but due to the delays commented above they will be delivered in 2021. The kIUAs associated to the approval of some documentation will therefore be achieved in 2021.
Main Vessel[1] (Vacuum Vessel, Blanket, Divertor and TBM)	**Main Vessel:** - 23,004,719€ **Vacuum Vessel:** Budgetary changes: (-) The overall impact of Covid-19 cannot be fully determined at this stage. Increase of the ceiling in Amendment 13 of contract OPE-068 will be re-assessed by the end of 2021. Annual objective changes: "S5 Rotation of complete sector and ready for Lower and Upper Port assembly" [EU15.1A.3082260] is moved from Q1 to Q3 ➔ The delay is due to first of a kind activities (including several Non Conformities), as well as impact from Covid-19 restrictions. "Start of Factory Acceptance Test - Sector 5" [EU15.1A.3081300] is moved from Q2 to Q4] ➔ Negative float has been declared not recoverable. "Delivery of Sector 5 by EU-DA to ITER Site" [EU15.1A.08500] is postponed to 2022 ➔ The duration of the Sector Assembly has been revised based on the benchmark with Sector 6 (delivered by Korea). Change in targets (kIUA): Yearly target of CAS credits reduced from 21.505 to 15.004 kIUA ➔ THis is the consequence of the negative float declared not recoverable and further schedule delays, mainly due to First of a Kind activities and impact from Covid-19 restrictions. **In-Vessel (Blanket):** Budgetary changes: (-) The reduction in the forecast for the Blanket First Wall (BFW) Series is due to a higher amount implemented in 2020 for the first instalment. (+) Once BFW Series contract was signed in Dec-20, a re-assessment of the planning for the procurement of raw materials to be provided to the suppliers was carried out. In this case, one task order is advanced at the end of 2021 to comply with supplier's Beryllium free issue items demands. Annual objective changes: Contract signature for Task 1 30 Deg Sector Pipe Bundles [EU15.2A.12100] is postponed to 2022➔ ITER IO and EU-DA agreed to split the delivery of BCM pipe bundles in 4 batches to accommodate tendering phase durations

[1] The budgetary changes of Vacuum Vessel, In-Vessel Blanket, In-Vessel Divertor and Test Blanket Module actions are presented merged in one single line due to commercial sensitive information.

	of the BCM Series. With the new delivery sequence, the contract signature of Task 1 is planned in 2022. End of Manufacturing Report (ADMU) - OPE-443-01 [EU.16.01.79780] is deleted ➔ The Manufacturing Readiness Review (MRR) of Alternative Design Mock-Up is re-planned because some design activities (predecessors) are suffering delay. Task Order Signed for Auditors TO#01 - LOT 1 [EU16.01.61400] delayed from Q2 2021 to Q4 2021 ➔ Essential task order for the first of a kind cost plus fee type of contract. Negotiations were postponed because we had limited resources available and the priority is in the execution of the contract for the BFW series production. Change in targets (kIUA): Credits postponed to from 2021 to 2022➔ Once the contract for the BFW Series was signed in Dec-2020, both Suppliers have provided updated (realistic) dates for BFW Series production Task 1 and 2. With this new planning MS#3 Pre-Production Readiness Review Documentation - Start of Process Qualification is adjusted to 2022. **In-Vessel (Divertor):** Budgetary changes: (-) The Contract for Pins, Sleeves and Links is rescheduled to 2022 after agreement with IO on a new delivery scheme of these components. Annual objective changes: IPL PA 1.7.P2E.EU.01 APFC Signed [EU17.03.1040] postponed to 2022 ➔ For the Divertor Rails project, ITER IO proposed to delay the PA signature by one year to 2022, and F4E accepted. The reason for this delay was the need for IO to re-perform structural analysis of the system taking into account changes in the interfaces and expected dimensional deviations of the VV sectors. Prototype / Qualification of processes TCWS Transition Pieces of CB series Completed [EU17.01.1151220] postponed to 2022➔ Postponed to 2022 due to on-going PCR-001218 change of pipe thickness and tolerance requirement of PBS 17.TP Divertor Transition Pieces for Remote Handling Weldability which is on-going and under discussion between ITER IO and EU-DA. Release Technical Specification for PFC Series Production [EU17.2B.12590] postponed from Q1 to Q 2021 ➔ On-going discussions with IO on PA Annex B update have delayed the preparation of the IVT Series technical specifications Change in targets (kIUA): NA **TBM:** Budgetary changes: (-) The signature of the OMF-1070 has been delayed for contractual and Covid-19 reasons, leading to the postponement to 2022 of a task order.

	Annual objective changes: TO 01 Signed for Preliminary Design of WCLL AS [EU56.01.10180] ➔ Procurement strategy was changed to multiple contractors in cascade in order to mitigate risk related to supplier financial difficulties. As a consequence, longer time for the overall process was needed. Also, longer time due to COVID-19. Impact on cascade to the signature of Task Orders. Task Order F4E-OFC-1070-01 Signed for Proof of the TBM-Sets fabrication and assembly processes feasibility [EU56.01.80210] ➔ Procurement strategy was changed to multiple contractors in cascade in order to mitigate risk related to supplier financial difficulties. As a consequence, longer time for the overall process was needed. Also, longer time due to COVID-19. Impact on cascade to the signature of Task Orders. Task Order F4E-OFC-0950-01-02 Signed for Preliminary Design of HCPB TBM set [EU56.01.1227200] moved from Q1 2021 to Q3 2021 ➔ Since the activities foreseen in this Task Order may be impacted by the agreement between EU and Korea for Helium Cooled Pebble Bed Test Blanket System (HCPB TBS), it has been decided to delay its signature waiting for further progresses on negotiations with Korea. Change in targets (kIUA): NA
Remote Handling	Budgetary changes: + 5,559,515€ (-) Final design Phase 1 for IVVS is due to the fact that the final design has been split into two stages and the second half moved to 2022 in order to complete prototyping activities before as a risk mitigation measure. (+) Rad-hard electronics upgrade to include important safety features. Contract includes upgraded design, manufacturing and qualification. (+) New procurement strategy to optimize and accelerate the final design developments of first assembly items of NBRHS. Annual objective changes: Task Order Signed for (577-02-02) Prelim. Design MA-2 and Final Design MA-1 for CPRHS [EU23.03.14046592] ➔ The original scope of the task order for first assembly systems is extended with interrelated scope of second assembly systems. EU23.05.01863 is replaced by EU23.05.14054040 “Contract for Final Design of Monorail Crane for Neutral Beam Remote Handling System” due to change of procurement strategy to accelerate the first plasma system (Monorail crane) development. TO for Final Design Phase 1 for IVVS Completed (ADP Approved) [EU57.01.50266] changed from Q2 2021 to Q4 2021 ➔ Forecasted quarter changed since technical issue in the IVVS Design (cat.1 chit) is pending resolution by IO. Change in targets (kIUA): The change in CAS for PA 5.7.P1.EU.01 In-Vessel Viewing System from 1.28 to 1.68 is due to a 0.4 credit carry over from 2019 to 2020. The second session of the Preliminary Design Review meeting that was foreseen to be held in 2019 was held in January 2020 instead.
Cryoplant & Fuel Cycle	Budgetary changes: + 1,459,817€ (+) Anticipation of a task order from 2022 due to change in procurement strategy for the REMS TKM

	(+) OPE-376: New amendment needed to include commissioning activities in on-going contract. (-) OMF-989: forecast is revised due to error in original forecast. Annual objective changes: Annual objective "Delivery of Warm Regeneration System by EU-DA to IO" [EU31.01.11580] ➔ Delivery date postponed. Change agreed with IO Annual objective "Preliminary Design Review Approved of Primary & Cryostat Leak Detection System" [EU31.03.25740] is added ➔ Current objective related to GB18 [EU31.03.26800] is achieved. New objective has been selected for the correct follow up of GB18 in 2021. Change in targets (kIUA): For PA 3.4.P1.EU.01 Liquid Nitrogen Plant and Auxiliary Systems the decrease in CAS in due to postponement to 2022 of the "IO approval for Final Acceptance He Purifier in Area 53". The other changes are due to the review of granularity of Credit Allocation Scheme of these Procurement Arrangements.
Antennas and Plasma Engineering	Budgetary changes: + 2,716,854€ (+) Sum of minor changes Annual objective changes: Annual objective "Contract Signed for Supply of the EC ULs and Ex-Vessel Waveguides of ITER" [EU52.01.2000910] moved from Q3 to Q4 2021 ➔ Two months delay due to the ongoing Integrator FWC tender process. Annual objective "Task Order 01 Signed for Design Finalization, Manufacturing & Assembly of the EC UL Port Plug" [EU52.01.3000000] moved from Q3 to Q4 2021 ➔ Two months delay due to the ongoing Integrator FWC tender process. Annual objective "Contract Signed for Manufacturing of Isolation Valve Prototypes and Series Production" [EU52.01.520160] moved from Q2 to Q3 2021 ➔ Contract tender process extended due to required PSM & PCC approval to open the tender worldwide. "Task Order Signed for Support to IO and Design of EC Plant Controller" [EU52.05.500120] ➔ Change of description to include "Support to IO" in the Task Order scope. Change in targets (kIUA): The yearly and cumulative kIUA (CAS) value for PA 5.2.P1B.EU.01 Electron Cyclotron Control System have been detailed and revised in order to reflect accurately the yearly progress for each PA.
Neutral Beam Heating & Current Drive	Budgetary changes: - 113,417€ (-) The postponement to 2022 is basically due to delays in providing technical input for task orders preparation and due to change of procurement and implementation strategy, both triggered by C-RFX/IO. The new strategy foresees the starting of operations of all MITICA components by 2024. Therefore the task orders of full activities completion will be delayed after 2024. The technical input, necessary to launch the individual call for tender of task order is still immature for drafting the task order specification.

	(-) The postponement to 2022 is basically due to implementation strategy at site from RFX/IO. Therefore a further break down of the Procurement, On-Site Assembling and Testing Phases per System have been done and reflected in the F4E activities rescheduling, according to the updated Supplier Schedule. (+) ISEPS contract deviations (ITER units) linked to feedback from SPIDER and MITICA, evolution of interface requirements and additional site constraints. <u>Annual objective changes:</u> The annual objective "PA 5.3.P5.EU.01 Neutral Beam Active Correction Coils Signed " [EU53.05.00100] is postponed to 2022 ➔ Delay in providing and approving the required documentation for PA signature The annual objective "3rd set of Gyrotrons high voltage power supply completed at Supplier Site" [EU52.04.12635] is moved from Q1 to Q2 2021 ➔ Covid-19 impacts. Annual objective "Dispatch Invitation to submit final proposal for European Gyrotrons Procurement" [EU52.02.18380125] is moved to from Q1 to Q3 2021 ➔ Longer duration than expected for the finalisation of the MOU and call for tender for the Joint Procurement with DTT. Additional 2 months have been added to the schedule due to accommodate the presentation to the Bureau following the request of the Governing Board (December 2020). Annual objective Final Design Report of AGPS-CS of IHNB-1 & IHNB-2 Accepted by IO and approved by F4E [EU53.06.07680] ➔ BCP 860 pending approval <u>Change in targets (kIUA):</u> PA 5.3.P6.EU ➔ Rescheduling due to site integrated schedule ref. BCP860 and CAS milestones baselined ref to BCR 134585 PA 5.3.P9.EU.01 ➔ CAS values adjusted in accordance to IO database table
Diagnostics	<u>Budgetary changes:</u> - 3,145,240€ (-) The decrease is due to cancelation of CFT GRT-1103 due to no compliant tenders being received. (-) CFT OMF-1126 launched Q2 2021 (foreseen originally in Q1), as competitive procedure with negotiation, which pushes the signature of this task order into 2022. (+) The forecasted change is derived from the analysis of the outcome of call for tender OPE-1055 which has been cancelled in December 2020 due to no compliant tenders within budget. As a result, F4E identified some missing items and that a revision of cost estimates for one item was required. These changes are introduced in the call for tender relaunched OPE-1150. (+) New grant added as a result of failure of call for tender GRT-1103 (no compliant tenders received) but with reduced scope focused on critical first plasma items only, to reduce technical and cost uncertainties and ensure a successful call for tender.

	Annual objective changes: "Manufacturing Design for Bespoke Instrumentation Hardware Available" [EU55.01.0102290] moved from Q3 2021 to Q4 2021 ➔ Delays on the first task order of a new framework contract have impacted the milestone date. "Manufacturing Readiness Review meeting for Plant Controller" [EU55.01.0103640] moved from Q2 2021 to Q3 2021➔ Knock-on delay driven by the Final Design Review closure. Change in targets (kIUA): PA 5.5.P1.EU.01-02-16-17-19 Diagnostics - Magnetics & PA 5.5.P1.EU.01 Diagnostics - Magnetics Electronics & Software ➔ Values adjusted to the Magnetics' project split between sensors and electronics and software. PA 5.5.P1.EU.18 Diagnostics - Tokamak Services ➔ CAS values adjusted to current project progress. PA 5.5.P1.EU.09 Diagnostics - Low Field Side Collective Thomson Scattering ➔ CAS request sent to IO has not been released PA 5.5.P1.EU.06 Diagnostics - Equatorial Visible/Infrared Wide-Angle Viewing System ➔ Differences are due to a different procurement strategy adopted within the project. PA 5.5.P1.EU.10-11-12-13-14 Diagnostics - Port Engineering Systems➔ Upper port 10 addition to the scope of the project.
Buildings and Civil Infrastructures	Budgetary changes: + 6,312,833€ (+) SO II Firm part re-estimated and moved from TB09. Covid impact moved from risks. (-) TB04 Part of the general items of Option 4 were already committed at the end of 2020. (+) AE new contingency due to Covid impact. (+) TB06 New contingency added for remeasurable components. (-) TB13: the reduction in the forecast is due to a higher amount implemented in 2020 for the first instalment. (-) TB18: the reduction in the forecast is due to a higher amount implemented in 2020 for the first instalment. (-) TB09 Commitment for Hot Cell Complex is moved to 2022, the strategy is not yet finalized. (+) TB16 new commitment for uncertainty due to Covid-19. (-) TB21 is moved to 2022. (+) TB22 Commitments for completion and Final Fittings Works TO1 and TO2 have been reorganized and moved to 2021. Annual objective changes: The annual objective "Tokamak Building (11) RFIOC L3M area" [EU62.050206] is postponed from Q1 to Q3 2021 due to coordination with other BIPS and IO contractors. This has no impact on IO activities, as the start of IO works is not foreseen before November 2021. The type of milestone changed from "Predecessor of GB53" to "WP21 objective" since GB53 is obsolete. Annual objective Construction of Cryoplant Coldbox Building (52) Completed [EU62.05.460] is postponed from Q1 to Q4 2021. ➔ Taking-Over dates have been postponed to end of 2021 in line with more realistic TB04 target dates.

	"Tokamak Building (11) RFIOC Level L4 (Axis T10-T12)" [EU62.05.680] has been replaced by "Tokamak Building (11) RFIOC Level L4 (Axis T10-T12)" [EU62.600650] ➔ The milestone was updated to refer to RFIOC (Ready for IO Contractors) instead of RFE (Ready for Equipment). Change in targets (kIUA): Due to the new MINI CAS milestones distribution and Covid 19 impacts on construction site, changes have been brought to all projects distribution except for Aux building TB07, Aux building TB09/TB10, Aux building TB13, Aux building TB17 and Headquarters building.
Cash Contributions	Budgetary Changes: + 7,716,626€ (+) The forecast of the Cash Contribution to IO has been updated with the last information available in the IO Budget documents and the reconciliation tables accompanying the debit notes.
Supporting Activities	Budgetary Changes: + 16,694€ (+) Sum of minor changes. (-) There is a reduction in the forecast for the transportation due to the delays in the overall ITER schedule and of the Domestic Agencies in manufacturing the components, resulting in less components transported then scheduled during this period. Annual objective changes: Annual objective FwC F4E-OMF-1110 signed for Eng. Supp. Serv. in the Area of Nuclear Safety 2021-2025 [EU.NS.01.23220] is moved from Q1 to Q4 2021 ➔ The scope description of the Framework is updated. The delay to Q4 is due to changes in criteria delay in validation/approval chain and procedure put on hold due to legal issues (new clauses in contracts). Annual objective FWC F4E-OMF-1127 signed for System Engineering Support Services (2021-2024) [EU.PM.3051990] is moved from Q3 to Q4 ➔ The work planned in the Q1-Q3 2021 period is covered by the existing Framework contracts. Therefore, in order to prioritize resources, the signature of this new Framework contract moved to Q4 2021 with no impact on the planned work, as the 1st Task Order under this Framework is foreseen in Q1 2022. Annual objective Option release for extension of TO #23 under FwC F4E-OMF-0937-01 signed for QA Support to BIPS Project Team (cont.TO 03) [EU.PM.3035350] ➔ The Annual Objective was changed from signature of new task order to release of an option under existing Task Order 23.
Broader Approach	Budgetary changes: + 2,718,258€ (+) The change of strategy for the JT-60SA actively cooled Divertor defined in Jan-Feb 2021 (HFF elements, NHF elements and Divertor cassettes) leads to an increase in the forecast. (-) The definition of scope of the supply of the ECRH Waveguides is still under negotiation with QST and therefore the corresponding PA and associated technical specifications are on hold. The remaining time to the end of the year

	is considered as sufficient to finalise the technical specification and launch the tender, however not sufficient to sign the contract. This activity is postponed to 2022. (-) The cash contribution originally foreseen for 2021, was transferred to a large extent at the end of 2020, so there is no need to transfer this amount also due to the delay of operation. <u>Annual objective changes:</u> EU.BA.01.18580 – moved to 2022➔ The objective is postponed to 2022 and is replaced by another one (EU.BA.01.18620). The reason for the postponement of the original objective is that the definition of scope of supply is still under negotiation with QST and therefore the corresponding PA and associated technical specifications are on hold. The remaining time to the end of the year is considered as sufficient to finalise the technical specification and launch the tender, however not sufficient to sign the contract. EU.BA.01.13520 – moved to 2022➔ Due to unsuccessful procurement procedure, the placement of contract took longer resulting in the objective being delayed. Also the Procurement Arrangement related to this objective has been amended to reflect this with the expiration date 31st March 2022. EU.BA.01.6460 moved to 2022➔ There has been a delay in the delivery of a set key components so the assembly could not be completed. The 8 superconducting solenoids due to technical problems with inner surface of the solenoids and the welds could not be delivered on time. Repair activities and computed-tomography inspections were completed in 2020. The final test consisting of individual cold-testing of the solenoids are in progress and planned to be completed in June 2021. Mitigation actions consisting of the procurement of a set of new solenoids by the Voluntary Contributor is ongoing. <u>Change in targets (kBAUA):</u> At the stage of the preparation of the WP2021, there were no Procurement Arrangements signed yet. Several of them were in a draft stage. Due to the delay in the signature of some PAs and onsite activities the accrual of several credits are also delayed.

Budget modifications in the actions, reflected in the Table in Annex 2, may have also been triggered by a modification of the level of confidence assigned to the 2021 commitments. The cut-off level of confidence used in the tables is 70%.

1. DEFINITIONS, ASSUMPTIONS AND SUPPORTING INFORMATION TO WP2021 AMENDMENT 1

The 2021 Work Programme as amended by amendment 1 takes into account to the extent possible the EU Commission guidelines for the Programming document as requested by the Financial Regulation. It comprises a general overview of the progress of work and the procurement activities that will be committed during 2021, detailed objectives, expected results and target for each WP Action.

Main assumptions

The following assumptions are considered as the basis of the Work Programme 2021 as amended by amendment 1:

- The F4E schedule used for the preparation of this document is the one submitted to IO at the end of April 2021.[2]
- The F4E schedule takes into account:
  - ✓ The latest input and developments of the schedules from the F4E suppliers, taking into account the agreed fabrication routes and showing the real development of the work.
  - ✓ The most realistic assumption of Procurement Arrangement (PA) signature dates based on the current status of the design of components and on the forecasted dates of the required design reviews prior to the PA signature.
  - ✓ The available manpower in F4E, taking into account bottlenecks in specific areas where staffing is not sufficient to grant a prompt process of the work. In specific cases, F4E foresees to satisfy its manpower needs by using external contractors.
  - ✓ The most realistic assumptions on the input data availability from IO to take into account the existing delays and the agreed dates of data delivery.
  - ✓ The information provided by the other DAs through their monthly Detailed Work Schedule to take into account any possible delay in the delivery of items to F4E that can cause delays to the EU in-kind procurements.
- The budget figures are based on the MFF 2021-2027 adopted by the Council on 22/02/2021 and the associated French contribution. The budget summary table of Work Programme 2021 Amendment 1 (WP_table 1) reflects the current status of the budget for the 2021 financing decision.
- In order to achieve an improvement of the quality of the PAs that need still to be signed, a common F4E/IO effort is still in progress to better identify the requirements that are linked to the specific procurement.
- Technically and commercially complex procurements will be implemented whenever appropriate through the competitive dialogue procedure or through the negotiated procedure, in order to improve the alignment of supply chain response to F4E needs and to proactively adopt cost containment measures. This will be done in compliance with F4E Financial Regulation.
- Grants related to recurring and sequential R&D activities, with a well-defined development path eventually leading to an EU procurement package, will be implemented whenever appropriate, through Framework Partnership Agreements (FPA), in order to streamline and channel R&D funding, improve its effectiveness and decrease the administrative burden to beneficiaries and F4E alike.

[2] Except for the Work Programme objectives of action 7 Antennas and Plasma Engineering that reflect the situation at the end of September 2020 to reflect the change in procurement strategy.

- Procurements which require a very close coordination between F4E and other entities will be implemented, whenever appropriate, through the Joint Procurement procedure.
- All the activities described in the overview of each Action and the list of contracts in WP_Table 3 is intended as credited by PA or ITA. If an Action is not credited, then it is explicitly mentioned in the overview. This is not applicable for the Action “Broader Approach” (i.e. not credited).
- F4E endorsement of the Japanese Procurement Arrangement that foresees an EU financial contribution will be preceded by a budgetary commitment for the entire amount of the F4E contribution.
- Changes originated by IO, or other DA’s, will be fully compensated by the IO Reserve Fund.
- Regarding the WP2021 for Broader Approach, the main assumptions are that this is to be coherent with the individual BA Projects' Work Programmes and Project Plans as approved by the Broader Approach Steering Committee.
- The Art. 5 of the F4E Statutes states that the Joint Undertaking may award grants and prizes in accordance with the rules of its financial regulation. In this regard, Essential selection, award criteria and Upper funding limits are defined in these annexes.
- Article 74 (2) of the F4E financial regulation in conjunction with Article 1(5) of Annex III to the F4E Statutes provides for the possibility to make use of annual instalments for actions extending over more than one financial year. An annual instalment consists in breaking down a budgetary commitment into annual instalments. Annual instalments can be implemented according to forecast of annual payment due, forecast of progress in the implementation of the contract, or annual budget availability. The instalments proposed for 2021 correspond to the latter case. Instalments may be used under the following actions
    - ✓ Main Vessel (Vacuum Vessel, Blanket, Divertor and TBM)
    - ✓ Site Buildings and Power Supplies.

Definitions and supporting information

1. "Action" for the purposes of Work Programme means “a coherent area of action with objectives and resources”. The list of the Actions and their definition is defined in the main text of the SPD.

2. Each Action of WP2021 Amendment 1 comprises:

(a) **General overview** that is split into two parts. The “Progress of Work” part aims at providing the information concerning the activities foreseen during 2021 in that area. The “Procurement Activities” part instead focuses on the legal commitments foreseen during the year and to be covered by the financial decision and to be financed under the budget 2021. Furthermore, it includes (even if not explicitly mentioned):

i. Provisions for urgent general support tasks as cost/risk analysis, engineering support/analysis, I&C develop and support, experts, quality assurance and quality control, nuclear safety, CE marking analysis, transportation, storage, material characterization and qualification activities, resolution of non-conformities (in line with the mechanism agreed at ITER level), metrology and external legal support, cost of legal proceedings and alternative dispute settlement, including arbitration, as needed[3]. These tasks will be mainly implemented through specific contracts under existing framework contracts.

[3] In accordance to F4E WBS implementation rules, whenever a procurement activity is in support of a specific WBS L3, the related procurement should be implemented under the mentioned WBS L3. This is not the case for general technical support activities to multiple WBSs (e.g. external resource to support overall risk management, etc.). In this case, they are included under Action 13

ii. Provisions for payment of liquidated damages, late payment interests, cost escalation, claims, release of options, indexation and other financial compensations that F4E may be obliged to pay under its contracts.

iii. Provisions for amendments to ongoing contracts covered by a previous financing decision(s) in accordance with the Implementing Rules.

iv. Provisions for BREXIT-related contractual modifications.

v. Provisions for Covid 19 related contract modifications and Covid 19 related new contracts for ITER and Broader Approach

(b) **Annual objectives** defined as the achievement on time of the following milestones:

i. ITER Council/Governing Board (IC/GB) milestones in 2021;

ii. Milestones that will lead to the achievement of the future IC/GB milestones from the following years (defined as predecessor of future IC/GB milestones (if applicable).

iii. Key milestones marking significant schedule progress (only in the event that none of the above are applicable).

iv. Link with the ITER Project multi-annual objectives (defined as the whole set of IC/GB milestones): when a WP annual objective is a predecessor of a multi-annual objective (IC/GB milestones), it is clearly identified to which milestone is linked in the column “type of milestone”.

(c) The **expected results** define the main outcomes of the Actions.

(d) The **target** is defined, when applicable, as the yearly CAS foreseen to be achieved in 2021 and the cumulative CAS foreseen to be achieved by the end of 2021 per PA (PAs associated with each Action are listed in Table 2 of the main text of the SPD).The value is according to the CAS profile implemented in the F4E DWS.

(e) **Human resources** (see HR_Table 1 of annexes to HR REP annexes). The table shows an indicative estimate of the Full Time Equivalent (FTE) staff assigned to the specific Action to cover all the activities carried out in 2021. Per each Action it is identified the “core” team and the additional staff (i.e. legal, financial, contractual, project management) assigned to the action according to the F4E matrix structure. Remaining staff from the Commercial Dept., Admin. Dept. and Office of the Director is instead allocated per action on a pro-rata basis.

(f) **Procurement plan**:

i. Main Procurement Initiatives (see WP_Table 3 of these annexes): these are, per Action, the list of the foreseen main contracts with value higher than 139,000 Euros[4]. Amendments, claims, reimbursement, indexation, late interest and budget reserve are grouped together due to the sensitivity of this information. The list is based on the current information at the time of writing the Work Programme. During the implementation of the Work Programme activities, F4E may identify the need for new calls, group more activities in a single call or split one activity in more calls. This will in any case be performed preserving the scope and objective presented in WP2021. Contracts that do not fulfill the Work Programme scope identified for each Action are not covered by this financial decision and therefore will not be authorized. A change to this list shall be considered as a non-substantial for the purposes of the Article 32 point 4 of the F4E Financial Regulations if not affecting the available budget for 2021 within the limit of the flexibility rule and if any related changes to the scope of the annual Work Programme do not have significant impact on the nature of the Actions or on the achievement of objectives of the multiannual Project Plan.

[4] The threshold has been selected so to be in line with the FR.

ii. Value per Action: WP_Table 2 presents an indicative value of financial resources corresponding to each Action. F4E has evaluated the level of commitments planned for the Actions in 2021 by taking into account the progress of the project and the available manpower. A good implementation of the annual commitment is one of the objectives for F4E (see PP_Table 12 in Annexes to Project Plan). Any additional budget required and exceeding the currently available one will consist of unused appropriations adjusted to match the final needs.

iii. Indicative timeframe for launching the procurement and type of procedure/contract: the foreseen time of publication of calls and type of contracts is shown in WP_Table 5 of these annexes. The dates are indicative only and based on the present understanding of the project development. For specific contracts and specific grants or use of Joint Procurements the foreseen time of publication of calls is not included as no formal publication will take place (the signature date is used to give anyway an indication of time). Publication of the call for tender is intended as the date of publication on the Industry Portal (for open procedures/call for proposals) and the date of the Invitation letter to be sent out to the Suppliers (for negotiated procedures). For restricted procedures and competitive dialogues this milestone refers to the date of the call for expression of interest (first phase of the procedure).

iv. The plan may cover some activities moved from previous years into WP2021 due to changes in the overall planning and priorities.

v. The plan does not (and cannot) include the consequences for the Action of PCRs and deviations approved by the IO Director General or his delegates in the frame of Reserve Fund Management Plan. As a result, these will be implemented under the budget line 3.6. For information, F4E will present to the final meeting of the GB each year, in an amendment to the Work Programme, a summary of the PCRs agreed within the year and the activities that the PCRs (including those agreed in previous years) have funded.

vi. Grants and specific Grants are clearly identified and information is provided to fulfill art.58 of the Financial Regulation (see WP_Table 4 of these annexes).

vii. Framework Partnership Agreements (FPA) or Framework Contracts (FWC) are included in the year of signature for clarification purposes only and do not constitute part of the financing decision.

3. Some of the Work Programme activities refer to provision for recurrent activities with the same ultimate objective of supporting the final achievement either of the design (e.g. CAD support, engineering analyses, etc.), the manufacturing process (e.g. QA/QC Inspectors, engineering support for deviations analyses, CE marking, etc.) as requested in ITAs/PAs, or the site support services (access control and security, Facility Management Services, etc.). Therefore the description in term of the financing decision does not change significantly from one year to the next.

2. OBJECTIVES AND KEY PERFORMANCE INDICATORS

Work Programme objectives

The Work Programme objectives are the achievement on time of a selected number of milestones. A minimum of 4 objectives is provided per Action as described in below section 3.

There is a close link between the long-term planning (i.e. Project Plan) and the short-term activities (i.e. work programme). In the Work programme, F4E is tracking as Work Programme objectives some selected existing milestones leading to the IC/GB ones (i.e. the predecessors) and in the chain of all critical and near-critical paths. Therefore such milestones in the short-term will act as an alert against the increasing risk of missing any critical and near-critical path milestones in the longer term.

Annual objectives

From the full list of Annual objectives described in the Project Plan, the following ones apply directly to the Work Programme:

AREA	Objective[5]
Work Programme objectives	Implement a minimum percentage of Work Programme objectives *[including GB milestones and predecessors]* by end of the year
Credit Allocation Scheme [CAS]	Reach a minimum percentage of achieved CAS by end of the year
Annual budget	Implement minimum percentage of Commitment Appropriations by end of the year

Key Performance Indicators

From the full list of Key Performance Indicators described in the Project Plan, the following ones apply directly to the Work Programme:

Work Programme objectives

$$\frac{Number\ of\ Work\ Programme\ objectives\ met\ on\ time}{Number\ of\ Work\ Programme\ objectives\ planned\ to\ be\ met}$$

Credit Allocation Scheme (CAS)

$$\frac{Amount\ of\ CAS\ achieved}{Amount\ of\ CAS\ planned\ to\ be\ achieved}$$

Annual budget

$$\frac{Actual\ commitment\ executed\ to\ date + remaining\ commitment\ planned\ to\ be\ executed\ between\ date\ and\ year's\ end}{Latest\ approved\ annual\ commitment\ budget}$$

[5] Action 12 of the MAP Ad Hoc group endorsed by Governing Board 45 stated that "*The targets for these measures will be defined before the start of each year to which the measures apply*".

3. LIST OF WP2021 AMENDMENT 1 ACTIONS

Action 1. Magnets

Action 1	Magnets

TF & PF Conductors

Progress of Work

Progress of Work All TF and PF conductor activities are completed, only some storage of strands will be required.

Procurement Activities

Amendments and/or options for existing contracts may be signed (i.e., storage of strands, claims, deviation notices, etc.)

Pre-Compression Rings

Progress of Work

A new IO Task Agreement was signed in 2020 for extra scope: Additional PCR#10, eight 1/5 scale rings, 3 set of samples and additional pultruded length. The scale rings will be completed in 2021. Depending on the impacts of COVID-19, the additional PCR10, the samples and the additional pultruded length might also be completed in 2021.

Procurement Activities

Task orders related to Quality Inspection services might be renewed to follow up the manufacturing of the Pre-Compression Rings. Amendments and/or options for existing contracts may be signed (i.e., claims, deviation notices, etc.).

Toroidal Field Coils

Progress of Work

All 10 TF Winding Packs will be finally shipped to the insertion facility, where the activity will be at full swing to complete the last stage of manufacturing of the TF Coils. During 2021 three TF Coils will be delivered to IO. These delivery dates are highly dependent on the impacts generated by the COVID-19 outbreak and on the dates and quality of the TF Coil Cases delivered by Japan.

Procurement Activities

Amendments and/or options for existing contracts may be signed (i.e., Non-Conformities on free issue items, Project Change Requests, components storage, contract extensions, claims, deviation notices, etc.).

Task orders related to quality inspection services or production support might be signed to reinforce the TF Coil manufacturing activities.

Some task orders might be signed to cover for Engineering, Qualification and Testing activities related to the manufacturing of the coils.

Poloidal Field Coils

Progress of Work

PF #5 and PF #6 will be completed and handed over to ITER IO. The third PF Coil under F4E responsibility after PF #5 and PF#6 is PF #2, which will be completely finished and handed over to ITER IO for storage prior to assembly. The fourth PF Coil, PF #4, will be well advanced and all 8 Double Pancakes will be completed, stacked and prepared for the Winding Pack ground insulation. The evolution of these activities is highly dependent on the impacts of generated by the COVID-19 outbreak.

Procurement Activities

Amendments and/or options for existing contracts may be signed (i.e., contract extensions, claims, deviation notices, etc.).
Task orders related to quality inspection services or production support might be signed to reinforce the PF Coil manufacturing activities.
Some task orders might be signed to cover for Engineering, Qualification and Testing activities related to the manufacturing of the coils.
Some minor complementary Contracts might be signed, if needed, to support the production in the PF Building (i.e., Framework Contracts for materials, services, etc.)

WORK PROGRAMME OBJECTIVES

Milestone ID	Scope description	Forecast Achievement Date	Type of Milestone	PA/ITA
EU11.1A.24800	TF-EU07 Welding Completed	Q4 2021	Predecessor of GB23	PA 1.1.P1A.EU.01 Procurement of Toroidal Field Magnets
EU11.1A.28125	HPC- Approval by IO TFWP Acceptance Report (HP 8.4.6) / TFWP14	Q4 2021	Predecessor of GB54	PA 1.1.P1A.EU.01 Procurement of Toroidal Field Magnets
EU11.3B.01120	IPL > Delivery of PF2 Coil by EU-DA to IO	Q4 2021	WP21 objective	PA 1.1.P3A-B.EU.01 Poloidal Field Magnets 2,3,4,5,6
EU11.3B.571550	DP2 - PF4.- DP VPI Completed	Q4 2021	WP21 objective	PA 1.1.P3A-B.EU.01 Poloidal Field Magnets 2,3,4,5,6

EXPECTED RESULTS

The main expected results for this action are:

1. Completion of the shipment of all TF Winding Packs to the insertion facility.

2. Delivery to IO of 3 to 4 TF Coils.
3. Completion of IO Task Agreement scope: Additional PCR10, eight 1/5 scale rings, 3 set of samples and additional pultruded length.
4. PF Coil #2 completed.
5. All 8 Double Pancakes for PF4 completed.

TARGET

The target of 2021 is the achievement of a cumulative value expressed in kIUA (CAS):

	Yearly value	Cumulative value
PA 1.1.P1A.EU.01 Procurement of Toroidal Field Magnets	14.26200	75.52400
PA 1.1.P2A.EU.01 Pre Compression Rings	0	0.6
PA 1.1.P3A-B.EU.01 Poloidal Field Magnets 2,3,4,5,6	11.50000	27.72000
PA 1.1.P6A.EU.01 Toroidal Field Conductors	0	43.39
PA 1.1.P6C.EU.01 Poloidal Field Conductors	0	11.22880977

Action 2. Vacuum Vessel

Action 2	**Vacuum Vessel**

Progress of Work

In 2021 the manufacturing of all 5 Vacuum Vessel sectors will continue at full intensity. The first sector should be completed during 2021, but this being a First Of A Kind (FOAK) manufacturing activity, the uncertainty will remain until actual completion of the first sector mainly due to potential technically complex non-conformances and impact of Covid 19.

To transport the sectors, so-called Transportation Frame Covers will be manufactured as well.

Procurement Activities

Provisions will be made for the transportation of the sectors to the ITER site stage, resolution of non-conformities (if required), participation in collaboration meetings with the Korean DA for the final assembly and commissioning of the sectors.

Specific Contracts for support activities, like Inspectors, Documentation Support, Engineering and Analysis etc… will continue to be issued depending on the project needs.

WORK PROGRAMME OBJECTIVES

Milestone ID	Scope Description	Forecast achievement date	Type of milestone	PA

EU15.1A.1139800	PS3 VV9 Fabrication Complete	Q3 2021	Predecessor of GB25	PA 1.5.P1A.EU.01 Vacuum Vessel - Main Vessel
EU15.1A.1139820	PS4 VV9 Fabrication Complete	Q4 2021	Predecessor of GB25	PA 1.5.P1A.EU.01 Vacuum Vessel - Main Vessel
EU15.1A.3081300	START OF FAT - Sector 5	Q4 2021	Predecessor of GB16	PA 1.5.P1A.EU.01 Vacuum Vessel - Main Vessel
EU15.1A.3082260	S5 Ready for Lower and Upper Port assembly	Q3 2021	Predecessor of GB16	PA 1.5.P1A.EU.01 Vacuum Vessel - Main Vessel

EXPECTED RESULTS

The main expected results for this action are:

1. Completion of the first European Vacuum Vessel sector to the ITER site
2. Full “D-shape” of the second sector completed
3. All four segments of the third, fourth and fifth sector in last manufacturing step i.e. Outer Shell welding (each sector consists of 4 segments that are joint together to form the D-shape of the sector)
4.Transportation frame and cover ready for the shipment of the sector

TARGET

The target of 2021 is the achievement of a cumulative value expressed in kIUA (CAS):

	Yearly value	Cumulative value
PA 1.5.P1A.EU.01 Vacuum Vessel - Main Vessel	14.00500	68.79800

Action 3. In Vessel – Blanket

Action 3	In Vessel - Blanket

Blanket First Wall project

Progress of Work

In 2021, the start of the activities for the preparation of the production line for the manufacturing of the First Wall (FW) panels is foreseen. The procurement of main raw materials (i.e. Beryllium and CuCrZr) will be implemented by way of task orders. These materials are planned to be provided as free issue items to the Suppliers in charge of FW Panels manufacturing.

In parallel, a series of tests will be performed on the Mock-Ups and Full-Scale Prototypes manufactured under the contracts OPE-443. High Heat Flux Testing of the full-scale prototypes will be performed through a task order under framework contract OPE-319, while a Hot Helium Leak testing of the Alternative Design Mock-ups (ADMUs) will be carried out under contract OMF-1074.

The manufacturers of the full-scale prototypes (OPE-443) will also complete the manufacturing of the ADMU prototypes. These are planned to be High Heat Flux Tested through task orders under framework contract OMF-1033.

Procurement Activities

In 2021, the main procurement activities foreseen as part of the FW series manufacturing is the signature of task orders for the procurement of Beryllium and CuCrZr materials. A framework contract is planned to be signed to procure He leak test services. In addition, resources needed to support the follow-up of the FW panels manufacturing will be insourced through specific task orders. Specific task orders for audit services of the cost-plus fee type of contract OMF-900 are planned Provision of two different subsuppliers for solution annealing heat treatment of First Wall Panels is planned. Task orders for the High Heat Flux test of the ADMUs will also be signed, and options to perform testing and inspection activities to these components may be executed. Task orders for material characterization, additional thermal-mechanical finite element analysis and FSP metrology will be signed. In addition, the start of the manufacturing of mock-ups for ULBA Be qualification is foreseen. The call for tender for the procurement of standard parts for the FW series production will be launched.

Blanket Cooling Manifolds project

Progress of Work

In 2021, the main activities are related to the tendering phase for the Series production of Blanket Cooling Manifolds.

Procurement Activities

In 2021, the main procurement activity is the negotiation with tenderers leading to the award in 2022 of multiple framework contracts covering all eight tasks of the Blanket Cooling Manifolds series production. In addition, a task order of thermo-mechanical testing of preliminary welded support will be signed.

WORK PROGRAMME OBJECTIVES

Milestone ID	Scope description	Forecast Achievement Date	Type of Milestone	PA/ITA
EU15.2A.10090	Submission Deadline Tender for FwC BCM	Q4 2021	WP21 objective	PA 1.6.P6.EU.01 Blanket Manifolds
EU.16.01.208250	Published Call for Tender for Procurement of Standard Parts	Q4 2021	Predecessor of GB37	PA 1.6.P1A.EU.01 Blanket First Wall
EU16.01.61400	Task Order Signed for Auditors 2021-2024	Q4 2021	WP21 objective	PA 1.6.P1A.EU.01 Blanket First Wall
EU.16.01.79750	Manufacturing Readiness Review Completed (ADMU) - OPE-443-01	Q3 2021	WP21 objective	ITA (C16TD169FE) Supporting Development Fabrication & Testing of First Wall full-scale prototypes

EXPECTED RESULTS
The main expected results for this action are: 1. Proceed with the BCM Series tendering phase, e.g. submission deadline tender for FwC BCM 2. Start of tendering activities procurement of Standard parts for the First wall manufacturing 3. Signed Task Order for Auditors to follow-up the execution of the Cost plus Fee OMF-900 contract 4. Manufacturing Readiness Review Completed (ADMU) – OPE-443-01

TARGET		
The target of 2021 is the achievement of a cumulative value expressed in kIUA (CAS):		
	Yearly value	Cumulative value
1.6.P1A.EU.01 Blanket First Wall	0.0	0.1
PA 1.6.P6.EU.01 Blanket Manifolds	0.05	0.25

Action 4. In Vessel – Divertor

Action 4	In Vessel – Divertor

Inner Vertical Target project

Progress of Work

In 2021 the first Full Scale Prototype (FSP) of the Inner Vertical Target (IVT) is planned to be completed and shipped to IO (OPE-138-01) for assembly trials.

For the three additional FSPs (OMF-567) the progress is expected to be as follows:

For Lot 1 the fabrication of the Plasma Facing Units (PFUs) and the Steel Support Structure (SSS) will be completed.

For Lot 2 the fabrication of the PFUs and the SSS will be completed, the TA will be shipped to RFDA for HHFTing and the FSP integration will be completed.

Finally for Lot 3 the PFUs and SSS fabrication will be completed as well as the HHFTing in RFDA and the FSP Final Acceptance tests.

In regard to the preparation of the call for tender for the Inner vertical target series production, the related technical specifications will be completed.

Procurement Activities

In 2021 the main activity foreseen will be the launch of the call for tender for the series fabrication of the Inner Vertical Target.

Additional resources and inspectors will be needed to closely follow up the fabrication of the FSPs as well as the preparation for the IVT series contract. These needs are planned to be insourced through task orders. Provision for non-destructive examination equipment will be in

place. Moreover, commitments will be in place for the transportation of the OMF-567 contracts TAs to the testing site and for the transportation of the WEST elements to CEA.

Cassette Body project

Progress of Work

In 2021 all the materials for the first-of-a-kind (FOAK) will be received and the manufacturing of the FOAK of the standard cassette body for both contractors will continue (OMF-444 Lots 1 and 3).

Concerning the contract (OPE-1036) related to the fabrication of the transition pieces and remote handling flanges, the qualification will be completed and the manufacturing will start.

Procurement Activities

In 2021 the main activity foreseen will be the signature of Stage 2 for the cassette body series fabrication. The 1st amendment of the OMF-444 Lot 3 for the re-work the cassette body FSP in order to upgrade it to a standard cassette body to be installed into the machine is planned. Task Orders for the development of specific metrology equipment for the CBs will be placed. Furthermore additional resources will be needed specifically for Non Destructive Testing and metrology activities. These needs will be insourced through task orders.

Divertor Rails project

Progress of Work

For the Divertor Rails project, ITER IO proposed to delay the PA signature by one year to 2022, and F4E accepted. The reason for this delay was the need for IO to re-perform structural analysis of the system taking into account changes in the interfaces and expected dimensional deviations of the VV sectors.

Procurement Activities

N/A

WORK PROGRAMME OBJECTIVES

Milestone ID	Scope description	Forecast Achievement Date	Type of Milestone	PA/ITA
EU17.01.1050800	HP - Reception of the Conformity of XM19 and 316-LN-IG material for Standard CBs (M_CBST_S14B)	Q3 2021	WP21 objective	PA 1.7.P1.EU.01 Cassette Body
EU17.01.1169400	HP -Reception of the conformity of 316L Tubes (D_TPRHRM_02)	Q3.2021	WP21 objective	PA 1.7.P1.EU.01 Cassette Body
EU17.2B.12590	Release Technical Specification for IVT Series Production	Q1 2021	Predecessor of GB45	PA 1.7.P2B.EU.01

				Inner Vertical Target
EU17.2B.85750	Authorisation of shipment of the Testing Assembly to the HHF Testing Facility - OPE-567-03-01 (II.22)	Q2 2021	WP21 objective	PA 1.7.P2B.EU.01 Inner Vertical Target

EXPECTED RESULTS

The main expected results for this action are:

1. The procurement of materials for the series production of Std. CB will be completed (OMF-444 Lots 1 and 3)
2. Reception of the conformity of 316L tubes within the contract 1036 Transition Pieces and Remote Handling Flanges Series.
3. Completion of the inner vertical target plasma facing units with reference tube transition and alternative tungsten grades (OPE-138 Lot 1)
4. Completion of the manufacturing and qualification of the inner vertical target steel support structure (OMF 567 Lots 1,2,3)
5. Completion of the inner vertical target plasma facing units and twisted tapes (OMF 567 Lots 1,2,3).
6. Specs for the Series production of Inner Targets will be prepared.

TARGET

The target of 2021 is the achievement of a cumulative value expressed in kIUA (CAS):

	Yearly value	Cumulative value
PA 1.7.P1.EU.01 Cassette Body	0.000	0.56
PA 1.7.P2B.EU.01 Inner Vertical Target	0.725	3.115

Action 5. Remote Handling

Action 5	**Remote Handling**

Divertor Remote Handling System (DRHS)

Progress of Work

The focus will be given to the Final Design activities via two main development lines that will run in parallel: one for the Cassette Multifunctional Mover (CMM) and the other one for the Cassette Toroidal Mover (CTM). Final design activities will be accompanied with prototyping and laboratory test in some areas.

Procurement Activities

For both of the main development areas and the complementary activities, specific contracts will be launched through Remote Handling (RH) and Engineering Unit framework contracts. Grant

amendment will be supporting the complementary developments at DTP2 site. Contracts may also be signed for design activities.

Cask and Plug Remote Handling System (CPRHS)

Progress of Work

Activities are organized in two parallel development lines. One focuses on the first assembly casks that are first plasma components, the other one focuses on the nuclearized cask variants. After the completion of the preliminary design phase, final design development will continue on the full scope of the first plasma systems. Final design activities will be accompanied with prototyping in some areas. Non-first plasma nuclearized casks will continue with the preliminary design development.

Procurement Activities

For both of the main development areas and the complementary activities, specific contracts will be launched through Remote Handling (RH) and Engineering Unit framework contracts. Contracts are also planned to be signed for design activities.

Neutral Beam Remote Handling System (NBRHS)

Progress of Work

Activities are organized by subsystems and prioritized by their delivery needs for the different assembly stages. Main focus is given to the Monorail crane system that is first plasma item. Final design development of the Monorail crane system will continue, other non-first plasma systems will continue preliminary design developments towards design review. Final design activities will be accompanied with prototyping and laboratory test in some areas.

Procurement Activities

For the different development areas and the complementary activities, specific contracts will be launched through Remote Handling (RH) and Engineering Unit framework contracts. Contracts are also planned to be signed for design activities.

In-vessel viewing system (IVVS)

Progress of Work

Main focus will be given to the final design development that will continue towards the design review. Final design activities will be accompanied with prototyping and laboratory test in some areas.

Procurement Activities

For the different development areas and the complementary activities, specific contracts will be launched through Remote Handling (RH) and Engineering Unit framework contracts.

Common activities (transversal)

Progress of Work

Engineering support and expert activities will be performed for the four main operational activities, where needed. Complementary RH technology related design activities, qualification and prototyping will be carried out with a great focus on the field of control system, radiation hard technologies like electronics, camera.

Procurement Activities

Specific contracts will be signed under the new engineering support framework contract of Remote Handling and Engineering Unit framework contracts in order to carry out supporting activities for the four main operational procurement and for complementary RH technology related design activities, qualification and prototyping. Grant amendment will be supporting the complementary developments at DTP2 site. Contracts are also planned to be signed in some areas.

WORK PROGRAMME OBJECTIVES

Milestone ID	Scope Description	Forecast achievement date	Type of milestone	PA
EU23.03.14046592	Task Order Signed for (577-02-02) Prelim. Design MA-2 and Final Design MA-1 for CPRHS	Q2 2021	Predecessor of GB40	PA 2.3.P3.EU.01 Cask and Plug Remote Handling System
EU23.03.14056380	M7 Preliminary design review meeting held (MA-1 last PDR)	Q2 2021	Predecessor of GB32	PA 2.3.P3.EU.01 Cask and Plug Remote Handling System
EU23.05.14054040	Contract for Final Design of Monorail Crane for Neutral Beam Remote Handling System	Q4 2021	Predecessor of GB42	PA 2.3.P5.EU.01 Neutral Beam Remote Handling System
EU57.01.50266	TO for Final Design Phase 1 for IVVS Completed (ADP Approved)	Q4 2021	Predecessor of GB47	PA 5.7.P1.EU.01 In-Vessel Viewing System

EXPECTED RESULTS

The main expected results for this action are:

1. Signature of task orders for final design complementary scope of DRHS
2. Preparation for the final design review meetings of first plasma CPRHS
3. Preparation for the preliminary design review meetings of non-first plasma NBRHS systems
4. Preparation for the final design review meetings of IVVS

TARGET

The target of 2021 is the achievement of a cumulative value expressed in kIUA (CAS):

	Yearly value	Cumulative value
PA 2.3.P2.EU.01 Divertor Remote Handling System	0.2	1.4
PA 2.3.P3.EU.01 Cask and Plug Remote Handling System	0	0.8
PA 2.3.P5.EU.01 Neutral Beam Remote Handling System	0.32	0.62
PA 5.7.P1.EU.01 In-Vessel Viewing System	0.8	2.2

Action 6. Cryoplant and Fuel Cycle

Action 6	**Cryoplant and Fuel Cycle**

Fuel Cycle

Progress of Work

In the frame of the PA for leak detection and localization system, contract for the procurement of the Leak Detection systems will focus on design activities. Second phase of PA (localization systems) will include on tendering process of Helium Leak Localization systems, contract signature and start or design phase.

The type A radwaste treatment and storage system it is expected will be transferred to IO .

In the frame of the PA for REMS (Radiological and Environmental Monitoring Systems), the contract for design and manufacturing of 1st plasma equipment will be signed followed by the start of design activities. For REMS Tokamak, activities to related to design optimization and final design will take place. TOs under existing frameworks may be launched. An expert contract will be signed to support REMS activities.

The activities in the field of vacuum pumping will keep growing:

- For the Torus and Cryostat Cryopumping System, manufacturing of the 8 cryopumps will start.

- For MITICA and Neutral beam Cryopumps, the contract execution for MITICA Cryopump manufacturing and assembly (Lot1) will continue focusing on activities for production of the cryopump components and sub-assemblies. The supply of the charcoal coating of the cryopanels (Lot 3) will be completed in 2021. The task order for the MITICA Cryopump Installation tool will be launched.

- The execution of Front End Cryopump Distribution System will continue : Cryojumpers will be tested and delivered, Warm Regeneration System and Cold Valve Boxes will be manufactured and tested. Task order for qualification of instrumentation and control will be closed and the one for first of a kind manufacturing will be signed.

Procurement Activities

- Task Order for Instrumentation and control of Front end Cryosdistribution system and Torus and Cryostat Cryopumps
- Contract signature for final Design and procurement of Beryllium and environmental monitors (First plasma activities): First Of A Kind (FOAK)
- Contract signature of Cryostat (Helium) Localization
- Task order for Technical support
- Task order for Mitica Cryopump Installation tool+ Cryopump installation
- Task order for REMS Tokamak: Design optimization/Final Design
- Amendments for existing contracts may be signed.

Cryoplant

Progress of Work

Contract for the Mitica cryoplant in the RFX facilities (Padova, Italy) will be closed in 2021. For the cryogenic quench line header the scope of work will be focused on installation and testing. For LN2 Plant and Auxiliary Systems in the Cryoplant building at Cadarache installation will be completed and commissioning activities will initiated.

Procurement Activities

Amendments for existing contracts may be signed.

WORK PROGRAMME OBJECTIVES				
Milestone ID	**Scope Description**	**Forecast achievement date**	**Type of milestone**	**PA**
EU31.01.11580	IPL > Delivery of Warm Regeneration System by EU-DA to IO	Q4 2021	Predecessor of GB28	PA 3.1.P1.EU.02 Front End Cryopump Distribution Cold Valve Boxes and Warm Regeneration Box
EU31.01.305060	Acceptance of 4th batch of Cryopanels for Mitica cryopumps	Q2 2021	Predecessor of GB50	PA 3.1.P1.EU.04 Neutral Beam Cryopumps
EU31.03.25740	M.14 - Preliminary Design Review Approved of Primary & Cryostat Leak Detection System	Q2 2021	Predecessor of GB18	PA 3.1.P3.EU.01 Primary and Cryostat Leak Detection System

EU31.03.26280	Contract Signed for Helium Leak Localisation System	Q2 2021	Predecessor of GB35	PA 3.1.P3.EU.01 Primary and Cryostat Leak Localisation System (phase II - 1st Amendment)
EU31.03.26800	Quality plan approved for Primary and Cryostat Leak Detection system	Q1 2021	Predecessor of GB18	PA 3.1.P3.EU.01 Primary and Cryostat Leak Detection System

EXPECTED RESULTS

The main expected results for this action are:

1. Manufacturing Readiness Review of Torus and Cryostat cryopumps successfully passed.
2. Cryojumpers of Front end cryodistribution systems delivered.
3. Charcoal coating panels of Mitica Cryopump delivered.
4. Negotiation phase with tenderers for Helium Leak Localization closed.
5. Contract signature of 1st plasma activities for Radiological and environmental monitors systems.
6. End of installation LN2 Plant and Auxiliary Systems in building 51.

TARGET

The target of 2021 is the achievement of a cumulative value expressed in kIUA (CAS):

	Yearly value	Cumulative value
PA 3.1.P1.EU.03 Torus and Cryostat Cryopumps	1	1
PA 3.1.P1.EU.04 Neutral Beam Cryopumps	0.36	0.54
PA 3.1.P1.EU.01 Warm Regeneration Lines	0	0.2
PA 3.1.P1.EU.02 Front End Cryopump Distribution Cold Valve Boxes and Warm Regeneration Box	0.12224	0.35203
PA 3.1.P3.EU.01 Primary and Cryostat Leak Detection System	0.7	0.7
PA 3.1.P3.EU.01 Primary and Cryostat Leak Localisation System (phase II– 1st Amendment)	0	0
PA 3.1.P3.EU.01 Leak Detection and Localization System Common Activities	0	0
PA 3.1.P3.EU.01 Primary and Cryostat Leak Detection System (2nd Amendment)	0	0
PA 3.2.P5.EU.01 Water Detritiation System - Tanks	0	3.252
PA 3.4.P1.EU.01 Liquid Nitrogen Plant and Auxiliary Systems	1.29316	24.27610
PA 6.4.P1.EU.01 for Design of REMS	0.06	0.06

Action 7. Antenna & Plasma Engineering

Action 7	Antennas, Plasma Engineering & Operations

ANTENNAS

Ion Cyclotron Antenna

No activities of design foreseen in 2021.

Electron Cyclotron (EC) Upper Launcher and ex-vessel waveguides (Upper and equatorial launcher)

Progress of work

Following staged PA signed in March 2019, the remaining PA scope will be signed in Q4 2021. The procurement activities will proceed in parallel to final design work and procurement contracts for prototypes (under
ITA).
For PA based activities, the main action is the signature of the integrator framework contract that covers the overall scope for design finalization, fabrication, assembling and testing of the EC Upper Launchers and the ex-wessel waveguide systems. The main challenges are the timely placement of these contracts and the close technical follow-up required to guarantee quality, schedule and cost control. On the design front, main on-going activities are related to design, prototype fabrication and testing as well as qualification and requirements identification & verification for the ex-vessel systems, towards Intermediate Design Review (pre-FDR) in 2021. Management of changes (requirements, and interfaces) as well as technical complexity and diversity of launcher components remain one of the main challenges.

Procurement activities

PA activities: in addition to the follow-up activities related to the series fabrication of the diamond disks, the integrator framework and the first task order of this framework will be signed. The first task order of the integrator framework contract includes the design finalization of the components pending FDR and fabrication, assembling and testing of the EC Upper Launchers. Another framework contract is planned to be signed for the isolation valves prototyping and series production. Other contracts are foreseen in support of these main activities, most of them specific contracts on exiting frameworks. In addition, contracts are foreseen for the testing of diamond disks and for other mm-wave components (also implemented mainly with Task Orders on existing frameworks).

ITA activities: Support for Final and Build-to-print design will be ongoing during 2021, up to signature of the PA for the remaining scope in Q4 2021. The activities will be performed mainly through specific contracts as part of existing frameworks, related to chit resolution of the FDR held in 2019, and further design of the items not covered by the FDR (e.g. in-vessel waveguides, mirrors 3 and 4, and the ex-vessel waveguides system).

Engineering support activities are also foreseen in 2021, to both PA and ITA activities. Most will be implemented with existing framework contracts via new specific contracts.

Additional resources and inspectors will be needed to closely follow up the activities, these are planned to be insourced through task orders.

PLASMA ENGINEERING & OPERATIONS

ITER Operations
In 2021, new activites have started focused on setting up and implementing a tri-partite collaboration between F4E, Eurofusion and IO for preparatory work for first plasma and Tokamak systems commissioning. This will be implemented mainly via expert contracts and specific support contracts, to be placed in the year.

Plasma Engineering

Procurement Activities

A relevant part of the PE activity responds to (often urgent) requests and hence it is difficult to plan in advance. PE group in 2021 is going to focus on specific contracts in support of First Plasma preparation..

Electron Cyclotron Control System

Progress of Work

The Electron Cyclotron Control System development follows a staged approach. The delivery and installation of ECPC Stage 2 (the Gyrotron Commissioning Components (GCC) plant control system) already postponed to 2020 is further pushed by PCR 1134 which now foresees the RFE date of building 15 in February 2021. To partially recuperate this delay and to mitigate any further delays on the availability of the EC building B15, it will be installed in a temporary location allowing a partial but significant commissioning of the system. In parallel to the ECPC stage 2 testing, the design activities of ECPC Stage 3 and of the Subsystem Control Unit of the Upper Launcher (EC-UL-SCU) for first plasma will both continue.

Procurement Activities

The main activities for 2021 will regard the commissioning of the ECPC Stage 2 in the temporary location provided by ITER-IO and the integration with the available SCUs and GCC subsystems.

FALCON Testing Facility

The FALCON facility will support the project in 2021 by testing components and prototypes as needed. This will include testing of the ex-vessel waveguides cooling and of the GCC waveguides pre-series. Maintenance of the facility is foreseen in 2021 with a refurbishment of the RF dummy loads and a possible revision of the High Voltage Power Supplies.

Specific contracts under the existing framework contract for setup and operation of the EC components test facility (FALCON) are also envisaged in 2021, and the signature of contracts for other prototypes (e.g. windows) are also foreseen.

WORK PROGRAMME OBJECTIVES

Milestone ID	Scope Description	Forecast achievement date	Type of milestone	ITA/PA
EU52.01.2000910	Contract Signed for Supply of the EC ULs and Ex-Vessel Waveguides of ITER	Q4 2021	Predecessor of GB46	PA 5.2.P1B.EU.02 Electron Cyclotron Upper Launcher
EU52.01.3000000	Task Order 01 Signed for Design Finalization, Manufacturing & Assembly of the EC UL Port Plug	Q4 2021	Predecessor of GB46	PA 5.2.P1B.EU.02 Electron Cyclotron Upper Launcher
EU52.01.520160	Contract Signed for Manufacturing of Isolation Valve Prototypes and Series Production	Q3 2021	WP21 objective	PA 5.2.P1B.EU.02 Electron Cyclotron Upper Launcher
EU52.05.500120	Task Order Signed for Support to IO and Design of EC Plant Controller	Q4 2021	WP21 objective	PA 5.2.P1B.EU.01 Electron Cyclotron Control System

EXPECTED RESULTS

The main expected results for this action are:

1. Completion and signature of the PA amendment for the remaining scope of the Electron Cyclotron (EC) Upper Launcher and ex-vessel waveguides (Upper and equatorial launcher)
2. Completion of the pre-FDR for the remaining items to be designed (in-vessel waveguides, mirrors 3 and 4, and the ex-vessel waveguides system)
3. Signature of the technical integrator framework contract for the design finalization, fabrication, assembly and testing of the EC Upper Launchers and ex-vessel waveguide systems.
4. ECPC Stage 2 (GCC control system) commissioned at IO temporary location.
5. Testing of ex-vessel transmission lines prototypes and partial valve component mock ups.

TARGET

The target of 2021 is the achievement of a cumulative value expressed in kIUA (CAS):

	Yearly value	Cumulative value
PA 5.2.P1B.EU.02 Electron Cyclotron Upper Launcher	1.82990	1.82990
PA 5.2.P1B.EU.01 Electron Cyclotron Control System	0.05000	1.05000

Action 8. Neutral Beam and EC Power Supplies and Sources

Action 8	Neutral Beam and EC Power Supplies and Sources

Electron Cyclotron (EC) Gyrotrons, Power Sources and Power Supplies (PS)

Progress of Work

Completion of the Manufacturing and Factory Acceptance Tests of the UNITS 3-4 of the European EC Power Supply

Start of installation and commissioning of the EU EC Power Supply system

Technical Follow-up of the EC Power Supplies will continue

The performance of the improved 1MW Continuous Wave Gyrotron prototype will be verified with the long pulse, high power tests

The preparation of the offers to the Call for Tender of the EU Gyrotrons will be completed.

The evaluation of offers from the Gyrotrons manufacturers and the corresponding negotiations will be in progress.

Procurement Activities

Electron Cyclotron (EC) Gyrotrons:

The 5.2.P3.EU.01 Gyrotrons PA consists in the procurement of 6 units of 1MW Gyrotrons at 170 GHz for the Electron Cyclotron Heating and Current Drive system of ITER. The work scope includes the design, manufacturing, assembly, factory testing, delivery, on-site installation and commissioning of the Gyrotrons. Each gyrotron unit is composed of a gyrotron tube, a superconducting magnet, a filament power supply, a control system, a cooling manifold system and auxiliaries and supporting structures. After PA signature, the main activities will be Call for tender and evaluation of the offers.

Electron Cyclotron Power Supplies:

Options will be released for the main contract for the procurement of the EC Power Supplies and specific contracts signed for the supervision, auxiliaries and Interfacing systems.

Neutral Beam

Progress of Work

MITICA Beam Source – completion of the manufacturing for the majority of the sub-assemblies and starting of factory assembly

MITICA Beam Line Components – manufacturing of sub-assemblies will proceed as planned

NBTF progress towards transfer to IO of MITICA gas and vacuum system

NBTF progressing in MITICA instrumentation, control, diagnostic and assembly contracts

HNB confinement and shielding:

- PA signature (HNB Vessels) foreseen in the third quarter of 2021
- PA amendment (Drift Duct) foreseen in December 2021 pending timely preparation of PA documentation by IO

HNB General Assembly – Tooling:

- PA signature (HNB Tooling only) foreseen in the second quarter of 2021

HNB Power Supplies:

- Completion of detailed design activities for Residual Ion Dump (RID) Power Supplies and Acceleration Grid Power Supplies Conversion System (AGPS-CS). Progress with detailed design activities of High Voltage Deck 1, HV Bushing Assembly and Ion Source and Extraction Power Supplies

Procurement Activities

Specific contracts will be signed for technical follow-up.

HNB Assembly, Pressure Vessel and Magnetic Shielding and Active Correction and Compensating Coils

The components of the HNB1 and 2 Injectors are under PA-53-4. The whole scope of supply will be arranged in four to seven parts depending also of the availability of the technical build-to-print documentation from IO. Only the Tooling, first of the three parts of the PA 53-1- General Assembly, will be signed in 2021.

PA signature dates will depend on timely readiness of PA documentation to be prepared by IO, in particular technical specifications

Pending timely signature of the PAs, the procurement procedures for the HNB Vessels and for the Assembly Tooling will be launched in the last quarter of 2021.

Neutral Beam Test Facility (NBTF)

Specific contracts will be signed for the NBTF, namely for PRIMA Assembly and specific contracts for site supervision and support. Specific contracts for technical support in the area of Neutral Beam components and quality inspectors will be signed.

Neutral Beam Power Supplies

No major procurement activities foreseen as all procurement contracts are already in execution. Some options releases, mainly for spares, are foreseen.

WORK PROGRAMME OBJECTIVES

Milestone ID	Scope Description	Forecast achievement date	Type of milestone	PA
EU52.02.18380125	Dispatch Invitation to submit updated proposal for European Gyrotrons Procurement	Q3 2021	WP21 objective	PA 5.2.P3.EU.01 Electron Cyclotron Gyrotrons
EU52.04.12635	3rd set of the Gyrotrons high voltage power supply completed at Supplier Site	Q2 2021	WP21 objective	PA 5.2.P4.EU.01 Electron Cyclotron High Voltage Power Supply
EU53.06.07280	Start of Manufacture of Acceleration Grids Power Supply - Conversion System of Iter Heating Neutral Beam – 1	Q4 2021	Predecessor of GB27	PA 5.3.P6.EU Neutral Beam Power Supply
EU53.06.07680	Final Design Report of Acceleration Grids Power Supply - Conversion System of Iter Heating Neutral Beam – 1 accepted by IO	Q4 2021	WP21 objective	PA 5.3.P6.EU Neutral Beam Power Supply

EXPECTED RESULTS

The main expected results for this action are:

1. Procurement Arrangements signature for NB Vessel
2. Procurement Arrangement signature for Tooling
3. Launch of procurement procedure for the European Gyrotrons Procurement
4. EU Gyrotrons improved prototype: first test campaign on the long pulses test completed
5. Start of factory assembly of MITICA beam source
6. Completion of design activities for 2 power supplies systems of ITER units

TARGET

The target of 2021 is the achievement of a cumulative value expressed in kIUA (CAS):

	Yearly value	Cumulative value
PA 5.2.P4.EU.01 Electron Cyclotron High Voltage Power Supply	1.974	6.517
PA 5.3.P6.EU Neutral Beam Power Supply	1.2	16.56

PA 5.3.P9.EU.01 Neutral Beam Test Facility Components	1.85	18.25

Action 9. Diagnostics

Action 9	Diagnostics

Progress of Work

The Diagnostics Programme will continue during 2021 with the manufacture of several components or systems for delivery to ITER, mostly for First Plasma. These include various types of in-vessel magnetic sensors, the mineral insulated cabling, cable supports and junction boxes that will connect to all in-vessel diagnostic sensors and fission chambers for the radial neutron camera diagnostic.

The design of all remaining Diagnostics systems will also progress, both under the on-going Framework Partnership Agreements and under industrial design contracts, as will the design of ITER Port structures and the integration of Diagnostics into the Ports.

Several Diagnostics systems and subsystems will complete their design activities with approval of the final design review, including the Tokamak electrical feedthroughs, the collective Thomson scattering system.

Procurement Activities (contracts and grants)

Procurement activities will focus mainly on two areas: placement of manufacturing contracts or task orders for the production of components for delivery to ITER and procedures for the completion of the design of less mature Diagnostics systems. These will be complemented with contracts and task orders for the production and testing of prototypes and task orders for the provision of industrial expertise and for engineering analysis. In-sourcing of personnel is foreseen to support the Programme during 2021, as is the use of Inspectors for manufacturing contracts and Experts in specialist areas, including in support of design reviews. Amendment to on-going grants or specific grants may be required.

Manufacturing contracts

The Diagnostics Programme will launch and/or sign procurement procedures for manufacturing of several Diagnostics subsystems needed for First Plasma, either as individual contracts or as task orders under a framework contract to be launched during 2021.

One of these subsystems comprises opto-mechanical components of the Wide-Angle Viewing System (WAVS) in Equatorial Port Plug 12. These components will allow collection of images of the ITER plasma and wall, in both visible and infrared light, for transmission to cameras located in the port cell and must withstand harsh thermal and nuclear loads while maintaining exceptional optical performance.

Other subsystems include Vacuum Vessel electrical feedthroughs, platforms that will support bolometer cameras mounted in the Vacuum Vessel and bespoke instrumentation hardware for the huge array of magnetics sensors on ITER, among others.

A contract for the finalization of the design and the manufacturing of the In-Divertor electrical services and for the manufacturing of electrical auxiliary services (including clips, clamps, bosses and critical junction boxes will also be signed.

Design contracts

A grant will be signed in 2021 to complete the design of the WAVS in Equatorial Port 12.

The Diagnostics Programme will also launch procurement procedures, mainly in the form of task orders under a design framework contract to be signed in 2021 to complement or to finalize the design work for several Diagnostics, including the Core-plasma Thomson Scattering System, the Charge Exchange Recombination Spectrometer and the Bolometer Diagnostic.

WORK PROGRAMME OBJECTIVES

Milestone ID	Scope Description	Forecast achievement date	Type of milestone	PA
EU55.01.0102290	Manufacturing Design for Bespoke Instrumentation Hardware Available	Q4 2021	Predecessor of GB39	PA 5.5.P1.EU.01-02-16-17-19 Diagnostics - Magnetics
EU55.01.0103640	Manufacturing Readiness Review meeting for Plant Controller	Q3 2021	WP21 objective	PA 5.5.P1.EU.01-02-16-17-19 Diagnostics - Magnetics
EU55.01.203290	Task Order signed for Bespoke Instrumentation Hardware for Magnetics	Q2 2021	Predecessor of GB39	PA 5.5.P1.EU.01-02-16-17-19 Diagnostics - Magnetics
EU55.06.681270	HPC - IO Approval of FDR for Feedthroughs	Q3 2021	WP21 objective	PA 5.5.P1.EU.18 Diagnostics - Tokamak Services
EU55.06.682400	Approval of BTP documentation	Q3 2021	WP21 objective	PA 5.5.P1.EU.18 Diagnostics - Tokamak Services

EXPECTED RESULTS

The main expected results for this action are:

1. Delivery of the first batch of Inner Vessel Magnetic Coils assemblies.
2. Delivery of in-vessel cables for vacuum vessel sector 6
3. Completion of final design for Tokamak electrical feedthroughs
4. Completion of final design for the collective Thomson scattering system.

TARGET		
The target of 2021 is the achievement of a cumulative value expressed in kIUA (CAS):		
	Yearly value	Cumulative value
PA 5.5.P1.EU. 02-16-17-19 Diagnostics - Magnetics	0.12855	0.58513
PA 5.5.P1.EU.03 Diagnostics - Bolometers	0.118	0.118
PA 5.5.P1.EU.07 Diagnostics - Pressure Gauges	0.00000	0.19160
PA 5.5.P1.EU.18 Diagnostics - Tokamak Services	0.61836	1.00586
PA 5.5.P1.EU.15 Diagnostics - Radial Neutron Camera/Gamma Spectrometer	0	0.13769
PA 5.5.P1.EU.08 Diagnostics - CPTS 55.C1	0	0
PA 5.5.P1.EU.09 Diagnostics - Low Field Side Collective Thomson Scattering	0	0.17218
PA 5.5.P1.EU.04 Diagnostics - Core-Plasma Charge Exchange Recombination Spectrometer	0	0
PA 5.5.P1.EU.06 Diagnostics - Equatorial Visible/Infrared Wide-Angle Viewing System	0	0.11724
PA 5.5.P1.EU.10-11-12-13-14 Diagnostics - Port Engineering Systems	0.11126	1.49807
PA 5.5.P1.EU.01 Diagnostics - Magnetics Electronics & Software	0.14000	0.50000

Action 10. Test Blanket Module

Action 10	Test Blanket Module

Progress of Work

It is foreseen to continue the Preliminary Design activities and Safety Analysis for TBM Sets and Ancillary Systems.

The consultancy of an Agreed Notified Body, mainly for the qualification of the TBM Box, will continue as well as the handling and storage of EUROFER and other steel products.

In addition it is planned to complete the Post Irradiation Examination of EUROFER specimen, needed for EUROFER qualification and the preliminary Welding Procedure Specifications needed for the manufacturing of the TBM box.

The activities for the development of TBM Industrial Feasibility and Fabrication Technologies will commence.

The collaboration with EUROfusion and EFLs will continue.

In case EUROfusion would discontinue activities in the following area and F4E would not be able to use existing contractual tools, F4E might need to publish Call for Tenders for three new FwCs and sign:

- WCLL TBM Set Preliminary and Final Design Activities;
- WCLL-TBS Safety Analyses and Studies;
- Definition and codification of EUROFER97 design limits in RCC-MRx design and construction code.

Procurement Activities

It is planned to sign Task Orders or contracts for the start or the continuation of the following activities:

- Preliminary Design of TBM Sets, of Ancillary Systems and of the related Safety Analyses and studies;
- Consultancy of an Agreed Notified Body;
- Proof of the TBM-sets fabrication and assembly processes feasibility;
- Handling and Storage of EUROFER and steel materials;
- The transport of EUROFER and other materials/products to and from the storage facility.

In addition, specific contracts for support activities like engineering and analysis, experts, project management support and system engineering management may be issued depending on the project needs.

Moreover, if requested and approved by the TBM-Project Team Steering Committee, a cash contribution will be transferred to IO in order to execute TBM-PT activities common to several ITER Members.

The Test Blanket Module procurement plan is not in response to PA or ITA but to the TBM Arrangements (TBMAs). All activities are not credited.

WORK PROGRAMME OBJECTIVES

Milestone ID	Scope Description	Forecast achievement date	Type of milestone	PA
EU56.01.10180	TO 01 Signed for Preliminary Design of WCLL AS	Q3 2021	WP21 objective	NA
EU56.01.1227200	Task Order F4E-OFC-0950-01-02 Signed for Preliminary Design of HCPB TBM set	Q3 2021	WP21 objective	NA
EU56.01.1232060	TO 02 Signed for Safety Analyses for TBS PD	Q3 2021	WP21 objective	NA

EU56.01.80210	Task Order F4E-OFC-1070-01 Signed for Proof of the TBM-Sets fabrication and assembly processes feasibility	Q3 2021	WP21 objective	NA

EXPECTED RESULTS

The main expected results for this action are:

1. The completion of Post Irradiation Examination of EUROFER specimen.
2. The completion of the first on-going activities for the preliminary Welding Procedure Specifications needed for the manufacturing of the TBM box.
3. TBS WCLL Conceptual Design Review approved by the Review Panel

Target credit NA

Action 11. Site and Buildings and Power Supplies

Action 11	**Site and Buildings and Power Supplies**

Progress of Work

Construction works will progress for the Tritium Building (B14) civil works (TB18), and for the Neutral beam Power Supplies Buildings, Control Building and Fast Discharge Resistor Building (TB12).

Design activities for Emergency Power Supplies Buildings and equipment (TB13) and for the Plant Bridges (TB12) will progress, allowing a start of first construction activities planned for the Emergency Power Supplies buildings.

The remaining Auxiliary Buildings will progress with the Radio frequency building (B15) and expected to completion with the Cryoplant Buildings (B51 and B52) (TB04 scope). TB04 design activities will progress to completion for the Diagnostic Building (B74) and will progress for the Tokamak building (B11). The execution design, qualification and procurement of equipment will continue. Painting and finishing works will continue in the Tokamak Complex with painting finalized up to level 2 in the Diagnostic building (B14) and with painting finalized in Tokamak building (B11).

The manufacture of the cargo lift will start (TB02).

Design activities for the Hot Cell Complex will restart.

Specific contracts will be signed under ongoing framework support services and works contracts. Changes and exercise of options to the ongoing services and construction contracts in relation with Project Changes Requests (PCRs), input data delays, and re-allocation of scope between contracts will be implemented through amendments to the ongoing contracts.

Procurement Activities

Contracts to be signed by the end of 2021 include:

TB20: Doors Installation Tritium Building

TB22: Civil, Architectural, Finishing and Retrofitting works – first lot contract signature

SO II: Support to Owner for all activities including the Hot Cell Complex

The TB21 tender process will be launched in 2021 but awarded early 2022.

Specific contracts will be signed under ongoing framework support services and works contracts. This includes, for example, Facility Management, Site Security and Reception Services, Structural analysis, Building HMI Development, Engineering and Contract Management Consultancy Services (with special respect to cost and schedule assessment), Claim manager, and consultancy for advice on interpretation of French Regulatory Law 2012.

Cash contribution will cover the ITER site host agreement and the ITER Site Services Agreement.

WORK PROGRAMME OBJECTIVES

Milestone ID	Scope Description	Forecast achievement date	Type of milestone	PA
EU62.02.72206	HPC - IO approval of Contractor Final & Construction Design (Structure) for Bldg 46	Q4 2021	Predecessor of GB24	AUX BUILDINGS D&B TB13
EU62.02.72486	HPC - IO approval of Contractor Final & Construction Design (Structure) for Bldg 47	Q4 2021	Predecessor of GB26	AUX BUILDINGS D&B TB13
EU62.050206	IPL > Tokamak Building (11) RFIOC L3M area	Q3 2021	WP21 objective	MAIN MILESTONES
EU62.05.29019	NPC - Notice to Commence construction of Control Bldg 71 Non PIC	Q1 2021	Predecessor of GB34	AUX BUILDINGS D&B TB12
EU62.05.460	IPL > Construction of Cryoplant Coldbox Building (52) Completed	Q4 2021	GB21	MAIN MILESTONES
EU62.600650	IPL > Tokamak Building (11) RFIOC Level L4 (Axis T10-T12)	Q3 2021	WP21 objective	MAIN MILESTONES

EXPECTED RESULTS

The main expected results for this action are:

1. Tokamak Building last level Ready For IO Contractors
2. Emergency Power Supplies Building construction start
3. Cargo lift manufacturing activity start
4. Construction of Cryoplant Buildings (B51/52) completed

5. IO approval construction design civil works for the Medium Voltage Distribution Building LC/1A and LC/2B (B46 and B47)

TARGET

The target of 2021 is the achievement of a cumulative value expressed in kIUA (CAS):

	Yearly value	Cumulative value
MAIN MILESTONES	5.01601	5.01601
COMMON	6.79500	59.74365
TOKAMAK COMPLEX	17.35292	75.97513
AUX BUILDINGS TB03/TB04	10.82344	69.00260
AUX BUILDINGS D&B TB05	0.70156	15.00156
AUX BUILDINGS D&B TB06	2.14922	9.62922
AUX BUILDINGS D&B TB07	0.00000	6.37420
AUX BUILDINGS TB09/TB10	0.00000	0.00000
AUX BUILDINGS D&B TB12	6.52562	6.52562
AUX BUILDINGS D&B TB13	0.00000	0.00000
LOAD CENTERS	4.86800	4.86800
INTERCONNECTING ACTIVITIES	0.00000	0.72835
AUX BUILDINGS D&B TB17	0.06920	0.06920
COMMON CONTRACTUAL ACTIVITIES	0.00000	42.79000
PA 6.2.P2.EU.06 Headquarters Building	0.00000	13.85000

Action 12. Cash Contributions

Action 12	Cash Contributions

Cash Contribution to IO

In accordance with the ITER Agreement, the financing of the ITER Organization is ensured through contributions made to IO in the form of cash (10%) or in kind (90%) from Members. Cash contributions from ITER Members to IO are determined annually, based on estimates of the IO budget for the following year. The final figure is approved or modified by the ITER Council.

Cash Contribution to Japan

According to the ITER Agreement, there is a transfer of procurement responsibility from Euratom to Japan under the supervision of the ITER Organization. This is financed through a cash contribution from EU to Japan paid by F4E. An update of the schedule of payments is provided by the Japanese Domestic Agency (JA DA) twice a year.

WORK PROGRAMME OBJECTIVES

Milestone	Scope Description	Forecast achievement date	Type of milestone	PA
Cash to IO	Yearly Commitment [6]	Q4 2021	WP21 objective	NA
Cash to Japan	NB Power Supplies for Cadarache	Q4 2021	WP21 objective	PA 5.3.P6.JA.02

EXPECTED RESULTS

The expected result for this Action is to pay to IO the contribution as agreed by the ITER Council and to Japan as defined in the schedule for the relevant credits assigned to JA DA for those components transferred by the EU to them. As far as the cash to IO is concerned, the target for 2021 is to commit the cash contribution for 2022 according to the decisions due to be taken by the ITER Council in November 2021. As far as the cash to Japan is concerned, the target for 2021 is to commit the amount agreed in the Annexes C to the Japanese PA 5.3.P6.JA.02 due to be signed during the year and the contribution to reinforce the commitment for the escalation revision PA 1.1.P1B.JA.01.

Target credit NA

Action 13. Technical Support Activities

Action 13	Technical Support Activities

The procurement of the supporting activities is mainly performed through Framework contracts and specific contracts.

Technical Support to In-Kind Procurement

Engineering Support activities

[6] The cash contribution required by IO for the year N is committed by F4E at the end of the year (N-1). E.g. the commitment shown here in WP 2021 is the cash contribution to IO for 2022.

Engineering Unit during 2021 will continue supporting the ITER Departments project Teams (and to a limited extend the BA department) by providing them technical expertise and technical resources in the key domains of engineering and fusion technologies.
The unit will provide technical expertise and resources in the following areas:
Design office activities, System Design and Mechanical engineering, Analysis: Mechanical, Structural Dynamics, Civil engineering, Fluid Dynamics, Electro Magnetism, Nuclear Analyses; Design Codes and Standards; Instrumentation and Control; Metrology.
Beyond the preparation of task orders, the procurement activities in TSS will be mainly focused on renewing Framework Contract providers, for adapting the level of support to the needs of the project teams.

Material and Fabrication
For 2021 the Materials of the Engineering Unit has the aim to support the ITER Department's Project Teams (and to a limited extent the BA department) by providing technical expertise in the domains of Materials Science, Materials Technologies and Manufacturing Processes.
The group supervises development and qualification of material and joints. The group also supports material procurement and fabrication follow-up.
The focus for 2021 will be to support the critical components design and fabrication mainly in the areas off Magnets, Vacuum Vessel, EC Antenna, Neutral Beam and In-Vessel.

Assembly Integration and Validation (AIV)

Support to F4E management on review and assessment of proposed AIV IO policies and plan. Support to Configuration Management in potential future transversal PCRs/Deviation related to AIV scope of work; support to F4E teams in relation to AIV responsibilities on site (e.g. logistics, deliveries portal)

Nuclear Safety

Progress of Work

The scope includes the oversight of the implementation of all nuclear safety requirements by F4E and its contractors. The Nuclear Safety activities also provides support to the project teams involved in PIC/PIA (Protection Important Components/Activities) to ensure compliance with the necessary regulation. This includes support to nuclear safety management, identification of optimum positions for key nuclear safety issues, review of relevant documentation and nuclear safety inspections in F4E suppliers' premises.

The Nuclear Safety Unit also organizes trainings, workshops, seminars and other activities to raise and re-inforce the nuclear safety awareness within F4E.

Procurement Activities

A framework contract will be signed for the continuation of the supply of Services in the area of Nuclear Safety. All other activities will be implemented through Task Orders under existing frameworks.

Task Orders under existing framework contracts and the new one to reinforce the supply of Services for Nuclear Safety will be issued for the Nuclear Safety activities.

F4E will be supported by experts on on-site inspections services and on Nuclear Safety code standards, funded by F4E through expert contracts.

A nuclear safety culture assessment will be conducted at the end of the year by an external expert. A specific contract will be signed.

Quality Assurance and Quality Control

Progress of Work

The scope includes the support to project teams to ensure that the F4E quality requirements are correctly implemented and managed for the F4E contribution to ITER. In particular, support is provided in both domains of Quality Assurance (QA) and Quality Control (QC).

As for QA, support aims at ensuring that F4E's QA processes are properly followed in the development of the different ITER projects and in line with the F4E Quality Management Policy. As for QC, the support to the projects will be provided in the follow-up and control of the activities performed by F4E's contractors.

Procurement Activities

Task Orders under existing framework contracts will be issued for both the QA and QC activities.

CE Marking

Progress of Work

The scope includes the support to F4E Project Teams in providing assessments and reviews, for each PBS, of the compliance with CE marking directives & regulations (mainly Pressure Equipment Directive, Machinery Directive, Low Voltage Directive, Electromagnetic Compatibility Directive, Explosion Protection and Construction Product Regulation).

Procurement Activities

A framework contract will be signed for the continuation of support services in the area of CE marking and Task Orders under the new framework contract will be issued for the CE Marking activities.

Systems Engineering

Progress of Work

The scope includes the development and implementation of Systems Engineering practices, processes and tools and to support their correct deployment by the Project Teams. To cover this scope, external manpower is contracted across several areas, including Requirements Management and Verification (RMV) with emphasis on Verification, Design and Manufacturing Readiness Reviews, Interface Management, and other Systems Engineering topics.

Procurement Activities

Two framework contracts will be signed for the continuation of the supply of Services for Systems Engineering. Task Orders under existing framework contracts and the new ones will be issued to continue to support the F4E Project Teams both in Barcelona and in Cadarache.

Office of the Chief Engineer

Progress of Work

The Office of the Chief Engineer supports the Head of ITER Programme Department with respect to the scope of the EU in-kind components for ITER and in representing F4E towards the ITER Organisation. Among the main tasks are: the interaction with IO on the project technical baseline, including change control, and participation to the Configuration Control Boards, the management of transversal technical issues impacting several PTs, the coordination of F4E participation to ITER Independent Reviews and working groups focused on technical matters and the assurance of consistency, adequacy and maturity in relevant Design Reviews.

Procurement Activities

Task Orders under existing framework contracts will be issued to continue to complement the in-house Configuration Management and Issues Management capabilities with expert support from specialized companies.

WORK PROGRAMME OBJECTIVES

Milestone ID	Scope Description	Forecast achievement date	Type of milestone	PA
EU.ES.01.8140	Published Call for Tender for Engineering Support Contract	Q3 2021	WP21 objective	All
EU.ES.02.5860	Contract Signed for Mechanichal analysis of ITER Components LOT 1	Q4 2021	WP21 objective	All
EU.ES.03.60700	Contract Signed for Provision of System and Instrumentation Engineering Support for Nuclear Safety I&C	Q2 2021	WP21 objective	All
EU.PM.3035350	Option release for extension of TO #23 under FwC F4E-OMF-0937-01 signed for QA Support to BIPS Project Team (cont.TO 03)	Q3 2021	WP21 objective	All
EU.PM.3051990	FWC F4E-OMF-1127 signed for System Engineering Support Services (2021-2024)	Q4 2021	WP21 objective	All

EU.NS.01.23220	FwC F4E-OMF-1110 signed for Eng. Supp. Serv. in the Area of Nuclear Safety 2021-2025	Q4 2021	WP21 objective	All
EU.PM.51380	Task Order under OMF-0783-01 signed for Support to Technical Integration (cont. TO 05 OMF-783-01-02)	Q2 2021	WP21 objective	All

EXPECTED RESULTS

The main expected results for this action are:

1. Implementation of the framework contract F4E-OMF-xxxx which will provide Fusion for Energy with specific contracts in the field of Mechanical Analysis,
2. Provision of System and Instrumentation Engineering Support for Nuclear Safety I&C and Proc.
3. Support for Conventional I&C Systems.

Signature of a new framework contract to continue to provide support services in the area of Nuclear Safety.

Signature of a new framework contract to continue to provide support services in the area of CE marking.

Signature of two new framework contracts to continue to provide support services in the area of Systems Engineering.

The expected result for the activities in Nuclear Safety, Quality Assurance & Quality Control, CE Marking and System Engineering is to provide the requested support to all Project Teams on these matters.

In general, the target for 2021 is to contribute in achieving the cumulative credit forecasted for each action in this WP2021 thanks to the support granted to the work under each specific action.

The expected result for the activities performed by the Office of the Chief Engineer is to provide the requested support to the Head of the Department and to all Project Teams on the matters described in the Scope of Work.

In general, the target for 2021 is to keep safeguarding the EURATOM's investment in ITER while achieving the cumulative credit forecasted for each action in this WP2021 thanks to the support granted to the work under each specific action.

Transportation

Transportation

During 2021, Engineering /Transportation will be in charge of the management, on the F4E side, of technical aspects of the joint procurement with IO for the transportation of ITER components to the site in Cadarache. The scope includes the transportation of all ITER Components from the port/airport of entry (Fos or Marignane) to ITER site.

During 2021, this activity will mainly cover transportation of NON EU loads between Fos and Cadarache (EU-leg). The main cost driver is for Highly Exceptional Loads (HEL) that follow the dedicated ITER itinerary.
In 2021 focus will be again put on the optimization of the number of HELs and the related number of convoys, this jointly with IO, all DA's and Daher.

WORK PROGRAMME OBJECTIVES

Milestone ID	Scope Description	Forecast achievement date	Type of milestone	PA
EU.PM.3027530	Task Order Signed for TO 14 for Convention 4 for Real Convoys for Gendarmerie Services	Q2 2021	WP21 objective	All
EU.PM.4021975	Task Order Signed for TO 15 for Convention 4 for Real Convoys for Gendarmerie Services	Q4 2021	WP21 objective	All

EXPECTED RESULTS

1. Transportation of Highly Exceptional Loads amongst others, EU & JA-DA TF coils and EU & KO-DA VV-sectors between Maritime Port of Marseille and ITER site.
2. Gendarmerie Task Orders to escort the HEL convoys and
3. Task Orders for Management fees and for component transportation with contractor Daher will be signed

Target Credit NA

Other Technical Support Activities

Programme Management

Progress of Work

The main focus of Programme Management is on performance monitoring and reporting, preparation of the annual and multi-annual programme planning documents, scheduling support, change control, the maintenance and update of the cost situation, the continuous improvement of the risk registers in all project areas, increased standardization of reporting within the organization, the implementation of the Internal Compliance Programme for export control. Overall project management support and support to the use and maintenance of specific tools to support project and program management are also included.

Procurement Activities

A framework contract will be signed for the continuation of the supply of Project Management Systems Support Services.

Task Orders under existing framework contracts will be issued to continue to support the F4E Project Teams at Barcelona and Cadarache or at suppliers' premises.

Other Expenditures

Progress of Work

A general provision is foreseen for consultancy services (e.g. participation to specific committees, support/advice to F4E Management, technical support, management retreat, support on business processes management and definition and documentation management system support, etc.) as well as provision for interim management services, operational missions, insurance and audit.

This part also includes the provision of ICT support (hardware, software and services) for the specific benefit of the operational activities.

Logistic and legal support to operational activities is also included.

Procurement Activities

The above scope will be implemented mainly by issuing Task Orders under existing framework contracts and under a new framework contract that will be signed for external operational support on procurement and commercial activities.

Operational Support services

Progress of Work

A general provision is foreseen for operational support to F4E Programme Teams in Pre-procurement (this covers Business Intelligence & Market Analysis) and Procurement areas and Commercial contract management.

Procurement Activities

The above scope will be implemented mainly by issuing Task Orders under a new framework contract that will be signed for external operational support on procurement and commercial activities.

WORK PROGRAMME OBJECTIVES				
Milestone ID	**Scope Description**	**Forecast achievement date**	**Type of milestone**	**PA**
EU.PM.3081920	Task Order #05 under FwC F4E-OMF-0895 LOT 2 signed for Risk Management Senior Support (cont. TO 03)	Q2 2021	WP21 objective	All
EU.PM.3072460	Task Order under FwC F4E-OMF-0895 LOT 1 signed for	Q2 2021	WP21 objective	All

	PPM Support VV (cont. TO 08)			
EU.PM.3081580	Option 5 for extension of Task Order #02 under FwC F4E-OMF-895LOT 3 in Support on Planning & Scheduling BIPS	Q2 2021	WP21 objective	All
EU.PM.3076400	FWC F4E-OMF-(TBD) signed for Project Management Systems Support Services (2021-2025)	Q3 2021	WP21 objective	All

EXPECTED RESULTS

Signature of a new framework contract to continue to provide support services in the area of Project Management Systems Support.

The expected result for this Action is to provide the requested support to all Project Teams on matters concerning Programme management.

Signature of a new framework contract for external operational support on procurement and commercial activities.

The expected result for the activities in Operational Support services is to provide the requested support to all Project Teams on these matters.

The target for 2021 is to manage the F4E operative processes and to contribute in achieving the cumulative credit forecasted for each action in this WP2021 thanks to the support granted to the work under each action.

The expected result for this Action is to provide the requested support to all Project Teams on matters concerning additional services (i.e. logistics, ICT, legal, etc.).

Action 14. Broader Approach

Action 14	Broader Approach

JT-60SA

Progress of Work

The activities defined in the STP WP2021, as recommended by the STP Project Committee will be implemented. These include the procurement of critical spare parts and engineering services for EU already supplied systems and components, and selected machine enhancements and diagnostics in collaboration with EUROfusion.

Procurement Activities

Critical contracts for development and/or fabrication of the JT-60SA Actively Cooled Divertor, Error Field Correction Coils power supplies, Electron Cyclotron Resonance Heating power supplies, enhancements of Cryoplant and Power Supplies performance will be launched in 2021. The activities under the responsibility of F4E are carried out through grants, task orders of existing/new framework contracts or existing/new supply and service contracts. F4E will be continuously supported by experts, and on-site health and safety services to ensure safe operations, funded respectively by F4E through expert contracts and specific contracts. Specific Contracts for support activities like engineering and analysis will be issued depending on the project needs. Cash contributions on specific QST Call for Funds, covering EU Contribution to operation, maintenance and assembly will also be made.

IFMIF/EVEDA

Progress of Work

In 2021 the LIPAc (Linear IFMIF Prototype Accelerator) operation at Rokkasho will focus on attaining firm evidence on the expected performance of the accelerator up to 5 MeV and on the availability of the subsystems required for subsequent beam operations.

Procurement Activities

Additional contracts will have to be placed for demonstrating the operation and for consolidating the reliability and the beam availability. Preparatory activities for the forthcoming operation phases (commissioning of the accelerator at the nominal energy of 9 MeV and deuteron beam intensity of 125 mA in pulsed mode and continuous waves) will continue in 2021. F4E will be supported by experts, and on-site health and safety services to ensure safe operations as well as dedicated transportation services to support maintenance and refurbishment activities, funded respectively by F4E through expert contracts and supply, service and specific contracts. Cash contributions as contribution to Common Fund and Common Expenses will also be made.

IFERC

Progress of Work

The IFERC project comprises three activities, CSC (Computer Simulation Centre), REC (Remote experimentation Centre) and DEMO design and R&D. The CSC objective is to provide high power computer (HPC) resources for JA and EU scientists in order to advance simulation studies for ITER, JT-60SA and fusion reactors in general (e.g. DEMO). CSC will foster collaboration research projects between JA and EU by sharing computer resources and by further jointly developing state-of-the art models. REC activities will concentrate in three aspects: collaborative activities with JT-60SA, ITER, and the IFMIF-EVEDA LIPAc accelerator. A collaboration under the ITER BA agreement will start in April 2020 to advance test technologies for remote experiments and data transfer, including remote CODAC application testing, remote data access, live data viewing for ITER, fast data transfer, and secure remote connection. In DEMO design activities, priority will be given to activities also directly relevant for ITER and JT-60SA exploitation, such as plasma scenario development, divertor and power exhaust, breeding blanket and tritium extraction and removal. The objective of activities in fusion materials R&D will be to continue to support ITER in issues related to Tritium retention in first

wall materials, and to contribute to the materials database for future reactors such as DEMO, which will be in part validated in a future IFMIF type installation. All activities will be performed in collaboration with EUROfusion.

Procurement Activities

There are contracts to be placed for preparation of remote participation rooms for tests with ITER and IFMIF/EVEDA and testing activities as well as related to CSC for code adaptation for possible procurement process. F4E will be supported by experts funded by F4E through expert contracts. Cash contribution will also be made as EU contribution to the Project Team.

WORK PROGRAMME OBJECTIVES

Milestone ID	Scope Description	Forecast achievement date	Type of milestone	PA
EU.BA.01.18620	Contract signed for Supply of JT-60SA actively cooled Divertor HHF elements - Stage 1	Q4 2021	WP21 objective	Divertor for Operation Phase 3
EU.BA.01.19740	Remote participation tests REC-IO and REC-IFMIF completed	Q4 2021	WP21 objective	Collaborative activities with JT-60SA, ITER, and the IFMIF/EVEDA LIPAc accelerator
EU.BA.01.21040	Industrial Support to JT-60SA Integrated Commissioning and First Operation Completed	Q2 2021	WP21 objective	CON Cryoplant spare/replacement parts
EU.BA.01.31820	Supply of beam loss detection with high sensitivity	Q3 2021	WP21 objective	LIPAc Activities

EXPECTED RESULTS

The main expected results for this action are:

JT-60SA:

1. Contract placement for Error Field correction Coils
2. Contract Electron Cyclotron Resonance Heating Power Supplies placed
3. Power Supplies industrial Support to JT-60SA Integrated Commissioning and First Operation Completed
4. Cryoplant industrial Support to JT-60SA Integrated Commissioning and First Operation Completed
5. Contract placement for the fabrication of Actively Cooled Divertor Plasma Facing Units (PFU) places

IFMIF/EVEDA

1. Procurement of injector spare parts to ensure availability of the LIPAc accelerator completed
2. Qualification of the complete LIPAc accelerator at 5 MeV in pulsed mode

IFERC

1. Detailed R&D plan for IFERC Phase II
2. Equipment for tests of remote experiment with ITER and IFMIF/EVEDA and support of remote experiments

TARGET

The target of 2021 is the achievement of a cumulative value expressed in kBAUA (CAS):

Supply of the ECRF Power Supply system (EU-ECRFPS)	0.746	3.730
Cash contribution JT-60SA 2021 (CASH02)	0.300	12.842
Power Supplies Spare Parts – Part 1 (SPO01)	2.420	2.420
EF Correction Coils (EFCC PS)	1.044	1.044
Development of JT-60SA Simulator (TKSIM01)*	0.100	0.100
Cryopumps (CRPUM)*	0.200	0.200
Massive Gas Injection System (MGI)*	0.100	0.100
Thomson Scattering (TOSCA)	2.420	2.420
On-site support for JT-60SA Integrated Commissioning and Preparation for Scientific Exploitation (EU-IC&EP)	1.200	1.200
Spare Parts and Support for Cryogenic System (CRSP01)*	1.800	1.800
Displacement and Stresses Monitoring System for the JT-60SA TF coils (DSMS02)	0.300	0.300
EDICAM (EDICAM02)*	0.300	0.300
Manufacturing and test of Irradiation Modules (LF01-2)	0.200	0.200
AF04 First Cryomodule of SRF LINAC (EU)	0.920	5.810
Control System (AF8-2)	0.000	0.200
Design feedback for Neutron Source (ED06-2)	0.200	0.200
Common Expenses	0.200	0.450
Common Fund	1.760	3.440
Demo design activities	0.639	0.639
Structure material development for in-vessel components	0.256	0.256
Database for material corrosion	0.064	0.064
Neutron irradiation experiment of breeding functional materials	0.543	0.543
Tritium technology for collection and inventory evaluation	0.128	0.128
CSC-EU	0.200	0.200
REC-EU	0.100	0.100
Project Team - EU staff	0.183	0.183
Project Team - EU Common Expenses	0.050	0.100

*Procurement Arrangements not yet signed are marked with an **

WP_TABLE 1 WORK PROGRAMME 2021 AMENDMENT 1 BUDGET SUMMARY

Budget Summary of the 2021 Work Programme - Amendment 1

Budget article		First amendment to the Work Programme Commitment appropriations (EUR)
3 1	ITER construction including site preparation	738,730,901.35
3 2	Technology for ITER	4,393,793.30
3 3	Technology for Broader Approach & DEMO	33,082,999.64
3 5	External Support Activities	20,173,870.74
3 6	Other Operational expenditure	4,519,930.01
Total Title III of the Budget		**800,901,495.04**
4 1	ITER construction from ITER host state contribution	185,236,653.44
4 2	Activities linked to ITER Organization	20,489,478.91
4 3	Other earmarked expenditure	1,399,515.87
Total Title IV of the Budget		**207,125,648.22**
Total amount available for the operational expenditure		**1,008,027,143.26**

Work Programme		2021 Work Programme Commitment appropriations (EUR) Grants	Procurement	Cash
3 1 + 4 1 + 4 2 + 4 3	Expenditure in support of ITER Construction	3,387,820.13	633,008,969.06	309,459,760.38
	Sub total ITER construction + RF	**945,856,549.57**		
3 2	Design and R&D in support of ITER, not credited	0.00	4,393,793.30	0.00
	Sub total technology for ITER	**4,393,793.30**		
3 3	Expenditure in support of Broader Approach	0.00	31,108,315.98	1,974,683.66
	Sub total Technology for Broader Approach and DEMO	**33,082,999.64**		
3 5	External Support Activities	0.00	20,173,870.74	0.00
	Sub total External Support Activities	**20,173,870.74**		
3 6	Other Expenditure	0.00	4,519,930.01	0.00
	Sub total Other Expenditure	**4,519,930.01**		
Totals Operational Expenditure		***3,387,820.13***	***693,204,879.09***	***311,434,444.04***
		1,008,027,143.26		

WP_Table 1 . Work Programme Budget Summary

WP_TABLE 2 INDICATIVE VALUE OF FINANCIAL RESOURCES FOR THE ACTIONS IN WP2021 AMENDMENT 1

Action #	Action	Budget WP2021	Budget WP2021 Amendment 1	Δ (Am.1 - Original)
1	Magnets	10,179,277	7,510,000	-2,669,277
2,3,4,10*	Main Vessel	167,984,720	144,980,000	-23,004,719
5	Remote Handling	30,840,485	36,400,000	5,559,515
6	Cryoplant & Fuel Cycle	11,110,183	12,570,000	1,459,817
7	Antennas and Plasma Engineering	38,773,146	41,490,000	2,716,854
8	Neutral Beam and EC Power Supplies and Sources	4,733,417	4,620,000	-113,417
9	Diagnostics	45,565,240	42,420,000	-3,145,240
11	Site and Buildings and Power Supplies	341,994,310	348,307,143	6,312,833
12	Cash Contributions	301,143,374	308,860,000	7,716,626
13	Technical Support Activities	27,233,306	27,250,000	16,694
14	Broader Approach	30,901,742	33,620,000	2,718,258
	Total	**1,010,459,197**	**1,008,027,143**	**-2,432,054**

*The Actions of Vacuum Vessel, In-Vessel Blanket, In-Vessel Divertor and Test Blanket Module are presented merged in one single line due to commercial sensitive information.

WP_Table 2 . Financial Resources per action

WP_TABLE 3 - 2021 MAIN PROCUREMENT ACTIVITIES (PER ACTION)

	Action	Signature	Type of contract
	Magnets		
CA09025	TO XY OMF-0937-01 Inspection Services for PF Coils 2-5 Mfr. (2nd Inspector) (cont. TO 05 OMF-0937-01) [24 months]	SC-PServ	Q3
CA09027	TO XY OMF-0937-01 Inspection Services for PF Coils 2-5 Mfr. (3rd Inspector) (cont. TO 07 OMF-0937-01) [24 months]	SC-PServ	Q4
CA10475	Task Order Signed for TO 92 Mechanical Engineering Support for the Magnets PT	SC-PServ	Q1
	Provision for amendments, claims, reimbursement, indexation and late interest	N/A	N/A
	Vacuum Vessel		
CA05910	Commitment 2021 for Engineering Analysis and Qualification of VV Sectors	SC-PServ	Q4
CA06293	Commitment and Task Order Signed - F4E-OMF-789-MG-B21 for 1 VV Resident Inspectors	SC-PServ	Q4
CA08395	Commitment and Task Order Signed - F4E-OMF-789-WT-A21 for 1 VV Resident Inspectors	SC-PServ	Q4
CA08398	Commitment and Task Order Signed - F4E-OMF-789-MG-A21 for 1 VV Resident Inspectors	SC-PServ	Q2
CA08400	Commitment and Task Order Signed - F4E-OMF-789-EN-B21 for 1 VV Resident Inspectors (ENSA)	SC-PServ	Q1
CA08401	Commitment and Task Order Signed - F4E-OMF-789-EN-A21 for 1 VV Resident Inspectors (ENSA)	SC-PServ	Q4
CA08402	Commitment and Task Order Signed - F4E-OMF-789-01-35 for 1 VV Resident Inspectors	SC-PServ	Q2
CA08832	Commitment and Task Order Signed - F4E-OMF-789-WT-B21 for 1 VV Resident Inspectors	SC-PServ	Q4
CA10831	Commitment signed for F4E-OPE-0304-01-82 for Transportation and re-assembly of TF & LF	SC-PSupply	Q3
CA11843	Contractual activities of F4E-OMF-1082-03-XX of UTPA files prod.during the VV manufacturing	SC-PServ	Q2
	Provision for amendments, claims, reimbursement, indexation and late interest	N/A	N/A
	In Vessel- Blanket		
CA07880	Task Order for Inspectors BFW - 2021-2022	SC-PServ	Q4
CA08354	TO 02 Procurement of Beryllium (Series)	SC-PSupply	Q4
CA08356	TO 01 Procurement of CuCrZr - LOT 1	SC-PSupply	Q2
CA09258	TO 01 for HHF (High Heat Flux) testing of In Vessel components (OMF-1033)	SC-PServ	Q3

CA09867	Task Order for Auditors TO#01 - LOT 1	SC-PServ	Q3
CA10478	TO 02 for HHF (High Heat Flux) testing of In Vessel components (OMF-1033)	SC-PServ	Q4
CA10929	TO 02 Material Characterization (Pre-Series)	SC-PServ	Q3
CA11180	Installment LOT 1 - OMF-900	PSupply	Q2
CA11283	Installment LOT 3 - OMF-900	PSupply	Q2
CA11349	TO for Resources - Documentation Management TO#01	SC-PServ	Q2
	Provision for amendments, claims, reimbursement, indexation and late interest	N/A	N/A
	In Vessel- Divertor		
CA06532	STAGE 2 Cassette Body Series Production	PSupply	Q4
CA09600	TO-21 OMF-0937-01 for Resident Inspector CSC-Welding	SC-PServ	Q1
CA10364	TO-21 OMF-0878-01 signed for Metrology 2021 for CB Series Stage 1 (cont. TO-06)	SC-PServ	Q1
CA10721	TO-14 OMF-0878-01 signed for Metrology 2021 for CB Series Stage 1	SC-PServ	Q1
CA10728	TO-28 OMF-937-01 signed for Resident QA Documentation Inspector	SC-PServ	Q2
CA10924	TO-04 OMF-1082-01Signed for the Provision and Qualification of Test Bench and UT Qualification Blocks for IVT Series	SC-PSupply	Q3
CA11622	Uncertainty related material price increase for the CB Series Stage II (P6 ID: EU.01.17.01-030)	PSupply	Q4
CA11897	TO-XX OMF-0871-01 Signed for Senior Mechanical Engineer Support for CB Series Stage 2	SC-PServ	Q4
	Provision for amendments, claims, reimbursement, indexation and late interest	N/A	N/A
	Remote Handling		
CA05358	Task Order Signed for Final Design Phase 2 (CTM) for DRHS	SC-PSupply	Q2
CA06538	Task Order Signed for Final Design Phase 2 (CMM) for DRHS	SC-PSupply	Q4
CA07449	Task Order Signed for Final Design Phase 1 for IVVS	SC-PSupply	Q4
CA07452	Task Order (TO#08) for Preliminary Design of remaining items	SC-PSupply	Q4
CA08384	Task Order (577-02-02) for Preliminary Design MA-2 (CES) and Final Design MA-1 (CDS) for CPRHS	SC-PSupply	Q2
CA10455	Task Order Signed for Manufacturing and testing of Camera Serializer & Rad Hard drivers for Actuators	SC-PSupply	Q2
CA10458	Task Order Signed for 2021 GTD-2 IVVS CS Development	SC-PServ	Q4
CA11081	Task order (OMF-1034-01-04) for Final Design MA-1 EPP & UPP (fast track)	SC-PSupply	Q2
CA11457	CON for Safety Improvement of BiSS ASICs and Assessment	PSupply	Q3
CA11774	Contract signed for Final Design of MRC for NBRHS	PSupply	Q4

	Provision for amendments, claims, reimbursement, indexation and late interest	N/A	N/A
	Cryoplant and Fuel Cycle		
CA07974	Mitica Cryopump Installation tool+ Cryopump installation	SC-PSupply	Q2
CA09047	contract signed for FD&Procurement of BE&ENV monitors (First plasma activities)	PSupply	Q2
CA10384	Contract Cryostat (Helium) Localization	PSupply	Q1
CA10387	Option 1 Cryostat (Helium) Localization	Option/Stage	Q2
CA11361	FECDS Technical support 2021	SC-PServ	Q1
CA11754	REMS TKM TO: Signature Final Design	SC-PServ	Q4
CA11766	Technical support CPFC	SC-PServ	Q2
	Provision for amendments, claims, reimbursement, indexation and late interest	N/A	N/A
	Antenna and Plasma Engineering		
CA01421	TO signed for Manufacturing of Isolation Valve prototypes and FDR documentation	SC-PSupply	Q3
CA01587	Task Order 03 Signed for Optical testing of Diamond Disks for EC Windows	SC-PServ	Q3
CA03742	Task Order Signed for Support to IO and design for EC Plant Controller	SC-PSupply	Q4
CA04981	TO signed for mm-wave testing of RF components	SC-PServ	Q2
CA08038	Contract Signed for Procurement of GCC Waveguides for ITER	PSupply	Q2
CA08930	Contract signed for Manufacturing of EC Window prototypes	PSupply	Q2
CA09611	TO4 signed for ECH waveguide components and M4 design finalisation	SC-PServ	Q2
CA10965	Task Order 01 Signed for Design Finalization, Manufacturing & Assembly of the EC UL Port Plug	SC-PSupply	Q4
CA11052	Task Orders for In-sourcing UL&EW 2021	SC-PServ	Q3
CA11077	Task Order 01 signed for Support to Owner	SC-PServ	Q2
	Provision for amendments, claims, reimbursement, indexation and late interest	N/A	N/A
	Neutral Beam and EC Power Supplies and Sources		
CA05360	NP - Contract Signed - PRIMA#3 Assembly	SC-PServ	Q3
CA07651	Commitment for Technical Support of Neutral Beam Components for 2022-23	SC-PServ	Q4
CA09429	TO for I&C interfaces with the EC Power Supplies	SC-PServ	Q4
CA11708	Commitment for Engineering Support Neutral Beam Power Supplies (2021-2022)	SC-PServ	Q2

	Provision for amendments, claims, reimbursement, indexation and late interest	N/A	N/A
	Diagnostics		
CA05665	Task Order Signed for Development of Mfg Specs for RNC port-plug components (EPP01) FWC-0905	SC-PServ	Q2
CA05705	Task Order signed for Bespoke Instrumentation Hardware - OFC-1087	SC-PSupply	Q2
CA05711	Task Order Signed for Port Plug design, testing and diagnostic integration TO6 - Final Design	SC-PServ	Q1
CA06111	TO for PFPO1 Design for CPTS -> Specific Contract 01 Signed for Preliminary Design CPTS	SC-PServ	Q1
CA06143	Contract signed for Final Design and Manufacturing of IDES and Manufacturing of In-Vessel Supports	PSupply	Q2
CA09101	Contract Signed for Irradiation testing of prototypes/materials	PServ	Q1
CA09323	Task Order Signed for TO17Bis for In-source personnel under OMF-0871	SC-PServ	Q3
CA10076	Contract Signed for Irradiation Testing for Bolometer Sensor Prototype & Electrical Connections	PServ	Q1
CA10548	Task Order Signed for CXRS Preliminary & Final Design & BTP	SC-PServ	Q3
CA11920	Contract Signed for CON Raw Material Supply for WAVS EP12	SC-PSupply	Q4
	Provision for amendments, claims, reimbursement, indexation and late interest	N/A	N/A
	Test Blanket Module		
CA06586	TO 02 Signed for Preliminary Design of HCPB TBM sets	SC-PServ	Q3
CA06587	TO 02 Signed for Preliminary Design HCPB TBS Ancillary Systems	SC-PServ	Q2
CA06816	TO 02 Signed for Safety Analysis for TBS Preliminary Design	SC-PServ	Q3
CA08656	TO 01 signed for Ancillary Systems WCLL PD	SC-PServ	Q3
CA08660	TO 04 signed for ANB Consultancy (AS + TBM Set)	SC-PServ	Q4
CA09802	TO 01 for Proof of the TBM-sets fabrication and assembly processes feasibility	SC-PServ	Q3
CA08917	TO2 Continuation Handling & Storage of EUROFER semifinish products	SC-PServ	Q4
CA06882	TO 03 signed for TO 03 signed for ANB Consultancy TBM box Qualification	SC-PServ	Q4
	Provision for amendments, claims, reimbursement, indexation and late interest	N/A	N/A
	Site and Buildings and Power Supplies		
CA06817	TO#23 for FWC AMF-0796 - TB04. Assessment claim 62 (Baseline)	SC-PServ	Q2
CA07181	SO II – Engineering support services Jan 2022 – Dec 2025. 1st Commitment	PServ	Q4
CA07217	Site Security and Reception Services for the ITER Site 2022 signed (from 12/21 to 12/22)	SC-PServ	Q4

CA07267	Iter Site Cooperation Agreement for 2021	PServ	Q3
CA08417	TO#02 for FWC-OFC-1006 for Eng, Contract & Claim Management consultancy services	SC-PServ	Q4
CA09311	TB20 - Commitment for Contract for B14 Doors Manufacturing / Installation	PSupply	Q4
CA09386	TO#02 for FWC for the H&S Joint Procurement for 2021-2022 (Baseline)	SC-PServ	Q2
CA09558	TB22 - Commitment for Completion and Final Fittings Works - TO#01 - for 2022	SC-PSupply	Q4
CA10174	TB11 - Commitment for Completion works Contract - TO#07	SC-PSupply	Q1
CA11601	TB13 - Commitment for Contract for Design & Construction of Bldgs 44, 45, 46 & 47. Instalments 2021	PSupply	Q2
	Provision for amendments, claims, reimbursement, indexation and late interest	N/A	N/A
	Supporting Activities		
CA06442	TO 2021 - Global transportation of HEL NON-EU ITER components	SC-PServ	Q4
CA11299	Correction of premium on the basis of building values declared	PServ	Q4
CA09707	Commitment 2021 for Operational Missions	PServ	Q1
CA10632	Third Party Liability insurance 2020-2025	PServ	Q4
CA10954	TO XX OMF-1115-01 for FP Diagn., BIPS I&C, Add. Heating and Real Time Software Support Activities	PServ	Q3
CA11705	TO 93 for KO-DA 1 HEL VV sector #01	SC-PServ	Q1
CA06445	TO for Management fees 2022	SC-PServ	Q4
CA11300	Option Faulty design	PServ	Q3
CA11845	TO 95 for US DA 2 HEL CS MODULES #2 and #3	SC-PServ	Q2
CA08976	2021 Commitments for Legal Services charged against Operational Budget	SC-PServ	Q1
	Provision for amendments, claims, reimbursement, indexation and late interest	N/A	N/A
	Broader Approach		
CA07935	Contract signed for JT-60SA Cryopump Design and Manufacturing	PSupply	Q1
CA07938	Contractual activities for JT-60SA Pellet Injector Design and Manufacturing - Centrifuge	PSupply	Q3
CA09642	Error field correction coil PS	PSupply	Q1
CA10369	Supply of JT-60SA actively cooled Divertor HHF elements Stage 1	PSupply	Q4
CA10370	Supply of JT-60SA actively cooled Divertor cassettes	PSupply	Q4
CA10371	Supply of JT-60SA actively cooled Divertor NHF elements	PSupply	Q4
CA10417	Option signed for Contract for optical fibres for jt60 thomson scattering	Option/Stage	Q2
CA10661	Repair PSYS & bleeders option	Option/Stage	Q4

CA10812	Procurement of 2 ECRH Power Supplies	PSupply	Q1
CA11133	TO01 for the maintenance of RFPS	SC-PServ	Q4
	Provision for amendments, claims, reimbursement, indexation and late interest	N/A	N/A

Table 3 . Main Procurement Activities per action

WP_TABLE 4 - LIST OF 2021 GRANTS PER ACTION

Action		Time of call	Value (In-Year Euros)	Budget line
Remote Handling				
CA10465	GRT-901 Amendment for DTP2 Additional experiments	Q4 2021	100,000	3.1
CA11850	Amendment #133540 for extension of duration of GRT-974	Q2 2021	22,000	3.1
Diagnostics				
CA10428	Amendment of SG05 for additional prototyping (FPA-384SG05)	Q2 2021	575,992	3.1
CA11340	Grant Agreement Signed for Completion of the design of WAVS in EP#12 and post-design technical support	Q2 2021	2,400,000	3.1
CA11613	Amendment 3 for FPA-393-SG05 - DN: grant extension signed	Q2 2021	249,828	3.1
CA11744	Amendment of F4E-FPA-384 SG05 for flexible procurement of hardware	Q2 2021	40,000	3.1
Total			**3,387,820**	

WP_Table 4 . Grants per action

NB: For the specific grants, as they do not have call for tender, the table refers to their signature date.

WP_TABLE 5 TIME OF CALL FOR THE PROCUREMENT PLAN

Indicative number, type of contract and timeframe for launching the procurement procedures.

Procurement Procedures	Q3 2020	Q4 2020	Q1 2021	Q2 2021	Q3 2021	Q4 2021
P Serv - Contract	7	6	3	6	3	6
P Supply - Contract	7	10	6	19	3	7
Pserv - Specific Contracts	21	30	23	18	8	23
PSupply - Specific Contracts	4	4	8	4	1	6

WP_Table 5 . Indicative number and type of contracts per quarter

NB:

- During the implementation of the Work Programme activities, F4E may identify the need for new calls, group more activities in a single call or split one activity in more calls. This will in any case be performed preserving the scope and objective presented in WP2021.
- When a call for tender is not defined yet, the call is indicatively assigned to 6 months before the signature of the contract.
- For the specific contract, as they do not have call for tender, the table refers to its signature date.

ESSENTIAL SELECTION, AWARD CRITERIA AND UPPER FUNDING LIMITS FOR GRANTS

With regard to grant actions referred to in this Work Programme, the essential selection and award criteria are:

Essential Selection Criteria

- The applicants' technical and operational capacity: professional, scientific and/or technological competencies, qualifications and relevant experience required to complete the action.
- The applicants' financial capacity: stable and sufficient sources of funding in order to maintain the activity throughout the action.

Essential Award Criteria

- Relevance and quality of the proposal with regard to the objectives and priorities set out in this Work Programme and in the relevant call for proposals.
- Effectiveness of the implementation as well as of the management structure and procedures in relation to the proposed action.
- Cost-effectiveness and sound financial management, specifically with regard to F4E's needs and objectives and the expected results.

With regard to the specific action, more details will be provided in the call for proposals. Thresholds and weighting for the essential and additional award criteria will also be indicated in the call for proposals.

A proposal which does not fulfill the conditions set out in the Work Programme or in the call for proposals shall not be selected. Such a proposal may be excluded from the evaluation procedure at any time.

The timetable and indicative aggregated amounts for the actions are defined in this Work Programme.

Upper funding Criteria

With the entry into force of the recast F4E Financial Regulation and Implementing Rules on 1st January 2016, the following upper funding limits apply for grants:

1.	Research, technological development and demonstration activities	40%
2.	Purchase/manufacturing of durable equipment or assets and of ancillary services approved by the Joint Undertaking as necessary to carry out such activities	100%
3.	Coordination and support actions, including studies	100%
4.	Management activities, including certificates on the financial statements, and other activities not covered by paragraphs 1 and 2	100%

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